PROSPECTIVE STUDY OF "ASSESSING THE RISK FOR DEVELOPMENT OF DEEP VENOUS THROMBOSIS IN SURGICAL PATIENTS USING ADAPTED CAPRINI SCORING SYSTEM"

Dissertation submitted to

THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY

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CERTIFICATE OF THE DEAN

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DECLARATION BY THE CANDIDATE

I declare that this dissertation entitled"" PROSPECTIVE STUDY OF "ASSESSING THE RISK FOR DEVELOPMENT OF DEEP VENOUS THROMBOSIS IN SURGICAL PATIENTS USING ADAPTED CAPRINI SCORING SYSTEM is prepared by me under the direct guidance and supervision of **Dr.CHITRA.S MS.,** Professor Department of General Surgery, MADURAI MEDICAL COLLEGE AND GOVERNMENT RAJAJI HOSPITAL, MADURAI. This is submitted to **TheTamilNaduDR.M.G.R. Medical University, Chennai,** in partial fulfillment of the regulations for the award of MS degree (Branch I) General Surgery course on April 2018.

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CONTENT

INTRODUCTION

Deep vein thrombosis is a significant cause of morbidity and mortality in surgical patients and one of the important preventable causes of in-patient mortality. Numerous studies have quoted data regarding the incidence of DVT in the Western population. There is a common presumption that VTE is not so frequent in the Asian population, particularly the Indian subgroup. However, recent Indian studies have shown that the incidence of VTE in Indian population is not as uncommon as thought before.

Lack of proper risk factor assessment tools, inadequate documentation, asymptomatic presentations of DVT, misdiagnosis or attribution to other diagnosis and inadequate follow up in the postoperative period are a few obstacles faced in quantifying the actual burden of DVT and the magnitude of its complications. Correctly identifying the risk group for DVT prophylaxis is very important to reduce the incidence of VTE and related morbidity and mortality. Routine DVT prophylaxis may increase the risk of bleeding and other complications in general surgery patients, in addition to the unnecessary financial burden to the health care delivery system .

The two commonly used methods to assess the VTE risk factors in patients include group assessment and individual assessment. Recent publications concluded that it would be more appropriate to use the individual risk assessment approach . Several individualized VTE risk assessment models (RAMs) have been proposed and evaluated clinically, the most notable being those developed by Caprini, Cohen, Kucher, Roger and NICE guidelines . The Caprini risk assessment model was derived more than a decade ago, based on a combination of clinical experience and published data. Several modifications of the model have been validated in surgical patients in the western population . In addition to risk assessment, the model also gives appropriate recommandations for prophylaxis according to the score and the level of risk. This RAM has been adapted several times by different individuals and organizations. In Asia, this risk assessment model has been adapted and validated in a study done in hospitalized patients in China . However, to the best of our knowledge, it has not been validated in the Indian population. Hence this study was conducted to assess the incidence of DVT in surgical patients and to assess the validity and reliability of adapted Caprini scoring in risk stratification for DVT prophylaxis.

REVIEW OF LITERATURE

Numerous studies had been conducted in risk stratification of DVT in surgical patients. A few salient studies have been reviewed here.

- Data by ***Caprini et al*** concludes that The Caprini RAM effectively risk-stratifies plastic and reconstructive surgery patients for VTE risk. Among patients with Caprini score 8, 11.3% have a postoperative VTE when chemoprophylaxis is not provided. In higher risk patients, there was no evidence that VTE risk is limited to the immediate postoperative period.

- The results of the study published by ***Bahl et al***. in surgical hospitalized patients were (relative risk >15 were) swollen legs (current), history of DVT and age >75. The relative risk of some of these factors, notably, swollen legs (current), history of DVT/PE, severe lung disease (<I month), age >75 were much higher than those assigned in the original Caprini RAM.

- ***Pannucci et al***. validated the Caprini RAM in plastic surgery patients and found that, compared to patients with a Caprini score of 3-4, patients with a Caprini score of 7-8 or more were significantly more likely to develop DVT $p < 0.001$.

REVIEW ON VENOUS SYSTEM AND DVT

Venous thrombosis is the formation of a semi-solid coagulum within the venous system and may occur in the superficial system (usually described as superficial thrombophlebitis) or the deep system (deep venous thrombosis or DVT). Venous thrombosis of the deep veins of the leg may be complicated by the immediate risk of pulmonary embolus and sudden death. Subsequently, patients are at risk of developing a post-thrombotic limb and venous ulceration. While DVT may occur in the upper limb, it is the leg that gives rise to the vast majority of the morbidity and subsequent complications of this condition.

HISTORY OF DVT

The earliest case of DVT was described by Sushruta in his book Sushruta Samhita around 600–900 BC. At some point, the increased incidence of DVT in women after childbirth was noticed, and in the late 1700s, a public health recommendation was issued to encourage women to breastfeed as a means to prevent this phenomenon; the DVT was called "milk leg", as it was thought to result from milk building up in the leg.

In 1856, German physician and pathologist Rudolf Virchow published what is referred to as Virchow's triad, the three major causes of thrombosis.The triad provides the theoretical framework for the current explanation of venous thrombosis,although it was focused on the effect of a foreign body in the venous system and the conditions required for clot propagation.

Multiple pharmacological therapies for DVT were introduced in the 20th century: oral anticoagulants in the 1940s, subcutaneous LDUH in 1962 and subcutaneous LMWH in 1982. Diagnoses were commonly performed by impedance plethysmography in the 1970s and 1980s, but the use of Doppler ultrasound techniques, with their increased sensitivity and specificity, largely superseded this method

THE ANATOMY OF THE VENOUS SYSTEM OF THE LIMBS

Veins are part of a dynamic and complex system that returns low-nutrient deoxygenated blood to the heart. Venous blood flow is dependent on multiple factors such as gravity, venous valves, the cardiac and respiratory cycles, blood volume, and the calf muscle pump. Alterations in the intricate balance of these factors can result in venous pathology.

Structure of Veins

Veins are thin-walled, highly distensible, and collapsible. Their structure specifically supports the primary functions of veins to transport blood toward the heart and serve as a reservoir to prevent intravascular volume overload. The venous intima is composed of a nonthrombogenic endothelium with an underlying basement membrane and an elastic lamina. The endothelium produces endothelium-derived relaxing factors such as nitric oxide and prostacyclin, which help maintain a nonthrombogenic surface through inhibition of platelet aggregation and promotion of platelet disaggregation. Circumferential rings of elastic tissue and smooth muscle located in the media of the vein allow for changes in vein caliber with minimal changes in venous pressure. The adventitia is most prominent in large veins and consists of collagen, elastic fibers, and fibroblasts. When a vein is maximally distended, its diameter may be several times greater than that in the supine Arterial blood flows through the main axial arteries of the upper and lower limbs before returning via the deep and superficial veins.

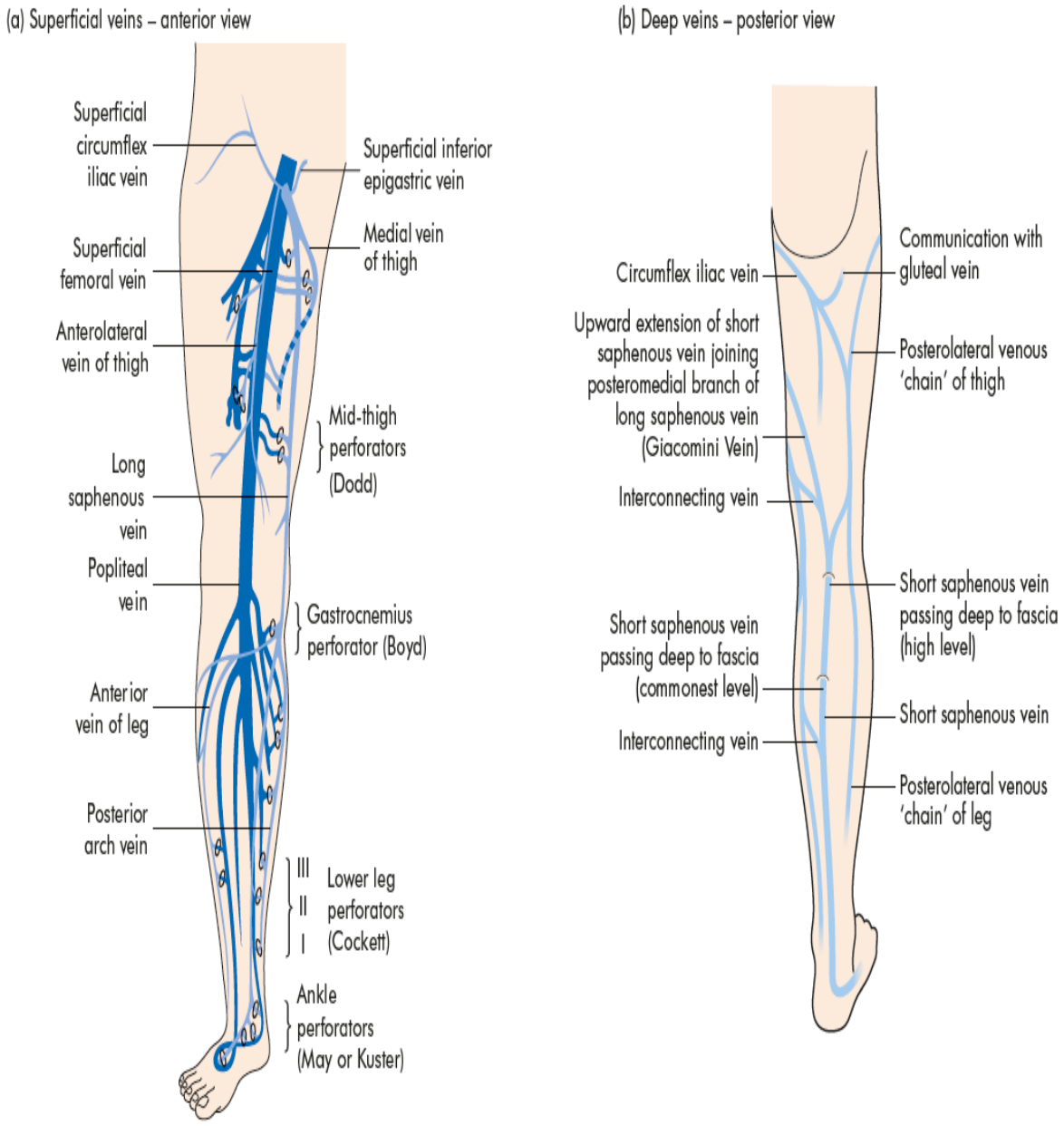
All of the veins of the upper and lower limbs contain valves, which ensure that blood flows towards the heart. The superficial venous trunks in the leg are the greater (long) and lesser (short or small) saphenous veins which lie above the muscle fascia of the limb. The cephalic and basilic veins are the superficial venous

trunks of the arm . Although the long saphenous vein is classically said to join the femoral vein at the saphenofemoral junction, a fixed point in the groin 2.5 cm below and lateral to the pubic tubercle, it is usually encountered somewhat higher. The lesser saphenous vein joins the popliteal vein at the saphenopopliteal junction at a variable site in the popliteal fossa but generally proximally to the knee joint crease. Blood passing up the superficial veins enters the deep veins at the saphenopopliteal and saphenofemoral junctions.

In the calf and thigh there are a number of valved perforating (communicating) veins that join the superficial to the deep veins at inconstant sites and which allow blood to flow from the superficial to the deep venous system. The most important of these are the direct perforating veins of the medial and lateral calf and the communicating veins around the knee and in the mid-thigh. The deep veins of the lower limb include three pairs of venae commitantes, which accompany the three crural arteries (anterior and posterior tibial and peroneal arteries).

These six veins intercommunicate and join in the popliteal fossa to form the popliteal vein, which also receives the soleal and gastrocnemius veins.

The popliteal vein passes up through the adductor hiatus to enter the subsartorial canal as the superficial femoral vein, which receives the deep (profunda) femoral vein (or veins) in the femoral triangle to become the common femoral vein, which then changes its name to the external iliac vein as it passes behind the inguinal ligament. The internal iliac vein joins with the external iliac vein in the pelvis to form the common iliac vein. The left common iliac vein passes behind the right common iliac artery to join the right common iliac vein on the right side of the abdominal aorta to form the inferior vena cava.



Anatomy of the superficial and deep veins of the lower limb

VENOUS PATHOPHYSIOLOGY

Blood enters the lower limb through the femoral arteries before passing through arterioles into the capillaries, which have a pressure of about 32 mmHg at their arterial ends. This pressure is reduced along the course of the capillaries and is approximately 12 mmHg at the venular end of the capillary. The pressure continues to fall in the main veins and is as low as −5 mmHg at the upper end of the vena cava where it enters the right atrium. The venous pressure in a foot vein on standing is equivalent to the height of a column of blood extending from the heart to the foot, e.g. approximately 100 mmHg .

To enable blood to be returned against gravity in the standing position, an auxiliary pump is required in the lower limb. This is the calf muscle pump, which is augmented to a lesser extent by the thigh and foot pumps. The deep veins of the calf are capacious and are joined by blind-ending sacks called the soleal sinusoids, which force blood into the popliteal and crural veins during calf muscle pump contraction, e.g. walking.

The foot pump also ejects blood from the plantar veins during walking. As the calf muscles contract, the veins are compressed and the valves only allow blood to pass in the direction of the heart. The pressure within the calf

compartment rises to 200–300 mmHg during muscle contraction. During muscle relaxation the pressure falls and blood from the superficial veins enters the deep veins through the saphenous junctions and the perforating veins. Each time this occurs the pressure falls in the superficial venous compartment until a threshold is reached, when the venous inflow keeps pace with ejection from the deep veins. This is normally around 30 mmHg, a fall of approximately two-thirds of the resting venous pressure. The net reduction in the pressure of the superficial system is dependent on the presence of patent deep veins, perforating veins and superficial veins, which must contain competent valves.

Ambulatory venous hypertension is a consequence of valve failure (reflux) or obstruction in the venous system and may eventually lead to lipodermatosclerosis and ulceration. The pathophysiology of varicose vein development is probably related to changes in the vein wall (dysfunctional smooth muscle cell proliferation, collagen deposition, decreased elastin content and increased matrix metalloproteinases) leading to venous dilatation and secondary valvular incompetence rather than to a primary valvular defect, which occurs in a small group of patients who have total lack of venous valves. Secondary varicose veins may develop in patients with post-thrombotic limbs and in patients with

congenital abnormalities such as the Klippel–Trenaunay syndrome or multiple arteriovenous fistulae. Simplistically, venous disease can be divided into

- Superficial Venous Incompetence
- Deep Venous Incompetence
- Combination Of These Along With Their Clinical Presentations

Clinical Evaluation

Evaluation of the venous system begins with a detailed history and physical examination. Risk factors for acute and chronic venous disease are identified. They include increased age, history of venous thromboembolism (VTE), malignancy, trauma and spinal cord injury, hospitalization and immobilization, obesity, nephrotic syndrome, pregnancy and the recently postpartum state, oral contraceptive use or hormone replacement therapy, varicose veins, and hypercoagulable states, as well as the postoperative state. Venous pathology is often, but not always, associated with visible or palpable signs that can be identified during the physical examination. There is variation among individuals in the prominence of superficial veins when the person is standing .

The superficial veins of a lean athletic person, even when normal, will appear large and easily visualized, but these veins will be far less obvious in the obese individual. The deep veins cannot be directly assessed clinically, and abnormalities within them can only be inferred indirectly from changes found on clinical examination.

Chronic venous insufficiency (CVI) may lead to characteristic changes in the skin and subcutaneous tissues in the affected limb. CVI results from incompetence of venous valves, venous obstruction, or both. Most CVI involves venous reflux, and severe CVI often reflects a combination of reflux and venous obstruction. It is important to remember that although CVI originates with abnormalities of the veins, the target organ of CVI is the skin, and the underlying physiologic and biochemical mechanisms leading to the cutaneous abnormalities associated with CVI are poorly understood.

A typical leg affected by CVI will be edematous, with edema increasing over the course of the day. The leg may also be indurated and pigmented with eczema and dermatitis. These changes are associated with excessive proteinaceous capillary exudate and deposition of a pericapillary

fibrin cuff that may limit nutritional exchange. In addition, an increase in white blood cell trapping within the skin microcirculation in CVI patients may lead to microvascular congestion and thrombosis. Subsequently, white blood cells may migrate into the interstitium and release necrotizing lysosomal enzymes, potentially leading to tissue destruction and eventual ulceration.

Fibrosis can eventually develop from impaired nutrition, chronic inflammation, and fat necrosis (lipodermatosclerosis). Hemosiderin deposition due to the extravasation of red cells and subsequent lysis in the skin contributes to the characteristic pigmentation of chronic venous disease . Ulceration can develop with longstanding venous hypertension and is associated with alterations in microcirculatory and cutaneous lymphatic anatomy and function. The most common location of venous ulceration is approximately 3 cm proximal to the medial malleolus .

Trendelenburg's test is a clinical test, historically important but now rarely used, that can help determine whether incompetent valves are present and in which of the three venous systems (superficial, deep, or perforator) the valves are abnormal. There are two components to this test. First, with the patient supine, the

leg is elevated 45° to empty the veins, and the GSV is occluded with the examiner's hand or with a rubber tourniquet. With the GSV still occluded, the patient stands and the superficial veins are observed for blood filling. The compression on the GSV is released and the superficial veins are observed for filling with blood. A negative result, indicating no clinically relevant venous reflux, is the gradual filling of the veins from arterial inflow. A positive result is the sudden filling of veins with standing while the GSV remains occluded indicating incompetent perforator and deep veins. The GSV valves are incompetent if the second component of the test yields a positive result.

Interpretation of the findings of Trendelenburg's test is subjective, and therefore, it has largely been supplanted by the more objective noninvasive vascular laboratory tests to localize sites of venous reflux.

The three factors described by Virchow over a century ago are

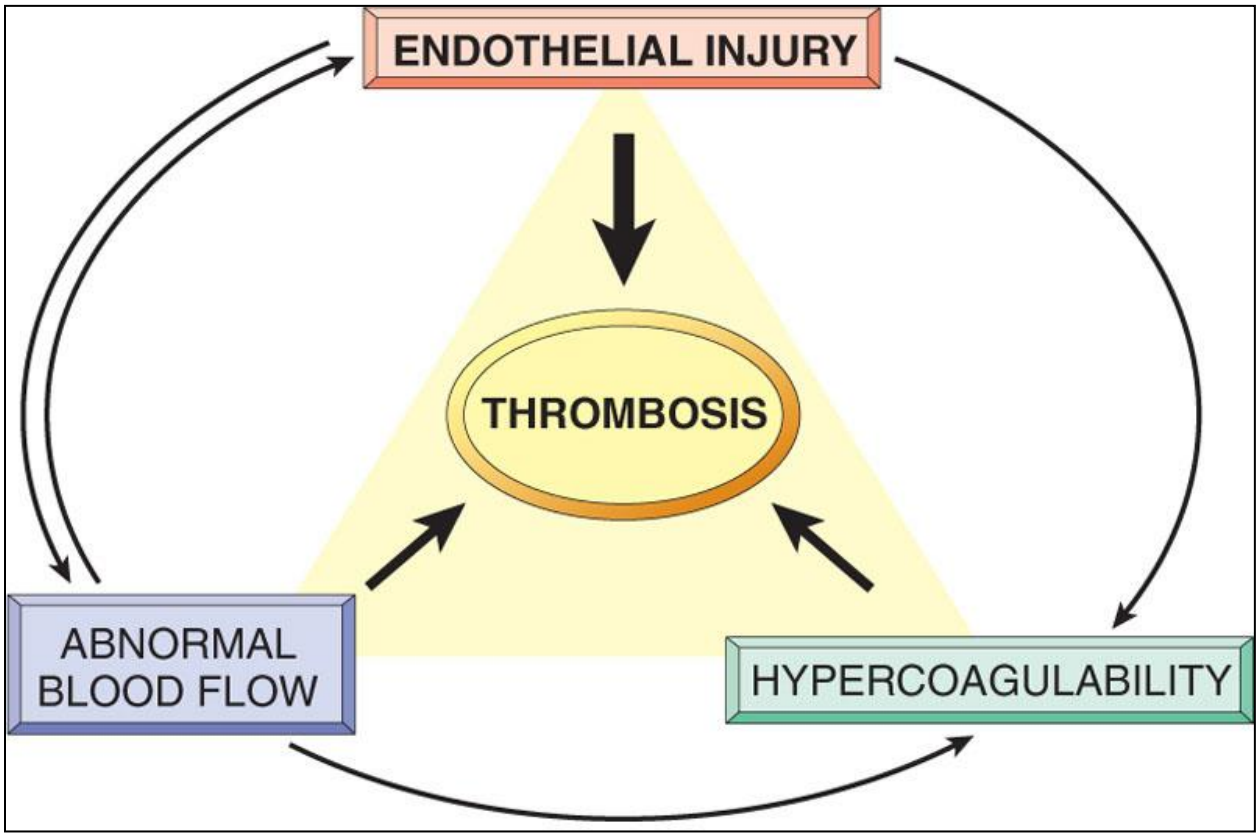
still relevant in the development of venous thrombosis.

These are:

• changes in the vessel wall (endothelial damage);

• stasis, which is diminished blood flow through the veins;

• coagulability of blood (thrombophili



There are many predisposing causes for venous thrombosis. The most important factor is a hospital admission for the treatment of a medical or surgical condition. Injury, especially fractures of the lower limb and pelvis, pregnancy and the oral contraceptive pill are other well-recognised predisposing factors. Endothelial damage is now known to be critically important. The interaction of the endothelium with inflammatory cells, or previous deep vein damage, renders the endothelial surface hypercoagulable and less fibrinolytic.

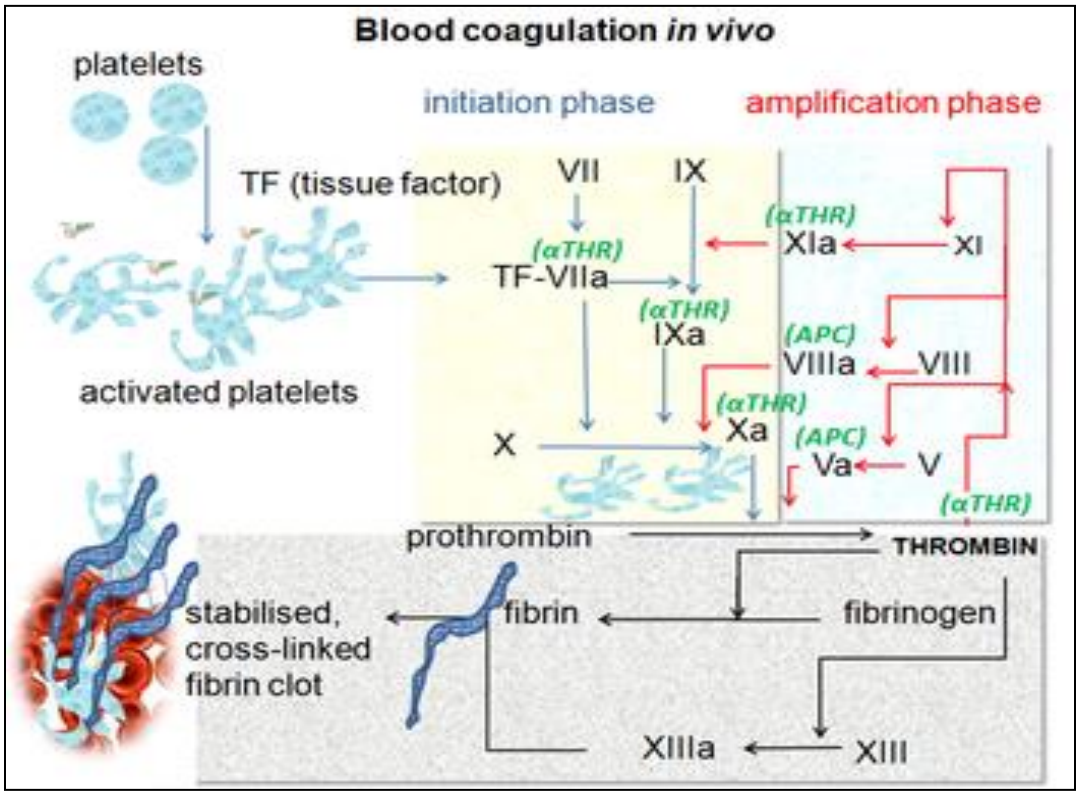
Stasis is a predisposing factor seen in many of the conditions, especially in the postoperative period, in patients with heart failure and in those with arterial ischaemia.

A number of conditions are associated with increased coagulability of the blood (thrombophilia). Deficiencies of antithrombin, activated protein C and protein S have all been shown to predispose to venous thrombosis in young patients.

Activated protein C deficiency is associated with inheritance of the factor V Leiden gene and may account for the higher incidence of venous thrombosis in Caucasian populations . It results in a small increase in the risk of venous thrombosis, although it may act in concert with some of the other predisposing factors. A thrombophilic cause should be sought in any patient presenting with an

episode of venous thrombosis who gives a family history of deep vein thrombosis or in whom there is no other predisposing factor.

Although the development of deep vein thrombosis is probably multifactorial, immobility (and hence stasis) remains one of the most important factors. Deep vein thrombosis is recognized as a complication of long-haul flights and other forms of travel.



Risk factors for venous thromboembolism

- **Acquired**
- Advanced age
- Hospitalization/immobilization
- Hormone replacement therapy and oral contraceptive use
- Pregnancy and puerperium
- Prior venous thromboembolism
- Malignancy
- Major surgery
- Obesity
- Nephrotic syndrome
- Trauma or spinal cord injury
- Long-haul travel (>6 hours)
- Varicose veins
- Antiphospholipid antibody syndrome
- Myeloproliferative disease
- Polycythemia

Inherited

- Factor V Leiden
- Prothrombin 20210A
- Antithrombin deficiency
- Protein C deficiency
- Protein S deficiency
- Factor XI elevation
- Dysfibrinogenemia

Mixed Etiology

- Homocysteinemia
- Factor VII, VIII, IX, XI elevation
- Hyperfibrinogenemia
- Activated protein C resistance without factor V Leiden

Pathology

A thrombus often develops in the soleal veins of the calf, initially as a platelet aggregate. Subsequently, fibrin and red cells form a mesh until the lumen of the vein wall occludes. The coralline thrombus then progresses as a propagated loose red fibrin clot containing many red cells. This likely to extend up to the next large venous branch and it is possible for the clot to break off and embolise to the lung as a pulmonary embolism. In this situation the embolus arising from the lower leg veins becomes detached, passes through the large veins of the limb and vena cava, through the right heart and lodges in the pulmonary arteries. This may totally occlude perfusion to all or part of one or both lungs (pulmonary embolism).

Acute right heart obstruction may lead to sudden collapse and death. Lung infarction is rare as the lung has a dual blood supply (bronchial and pulmonary arteries). Moderate-sized emboli can cause pyramidal-shaped infarcts.

Diagnosis

The most common presentation of a deep vein thrombosis is pain and swelling, especially in the calf – usually in one lower limb ; however, bilateral deep in up to 30 per cent. When the swelling is bilateral, deep vein thromboses must be differentiated from other causes of systemic oedema, such as hypoproteinaemia, renal failure and heart failure. Some patients have no symptoms of thrombosis and may first present with signs of a pulmonary embolism,

e.g. pleuritic chest pain,

haemoptysis

and shortness of breath.

Patients may also develop shortness of breath from chronic pulmonary hypertension. Sometimes the leg appears cellulitic and, very occasionally, it may be white or cyanosed: phlegmasia alba dolens and phlegmasia cerulia dolens . Patients who present with venous gangrene often have an underlying neoplasm.

Clinical examination for DVT is unreliable. Physical signs may also be absent. Mild pitting oedema of the ankle, dilated surface veins, a stiff calf and tenderness over the course of the deep veins should be sought. Leg pain occurs in about 50 per cent of patients with DVT but is non-specific. Homans' sign –

resistance (not pain) of the calf muscles to forcible dorsiflexion is not specific and should not be elicited. Tenderness occurs in 75 per cent of patients but is also found in 50 per cent of patients without objectively confirmed DVT. The pain and tenderness associated with DVT does not usually correlate with the size, location or extent of the thrombus. Clinical signs and symptoms of pulmonary embolism occur in about 10 per cent of patients with confirmed DVT. A low-grade pyrexia may be present, especially in a patient who is having repeated pulmonary emboli.

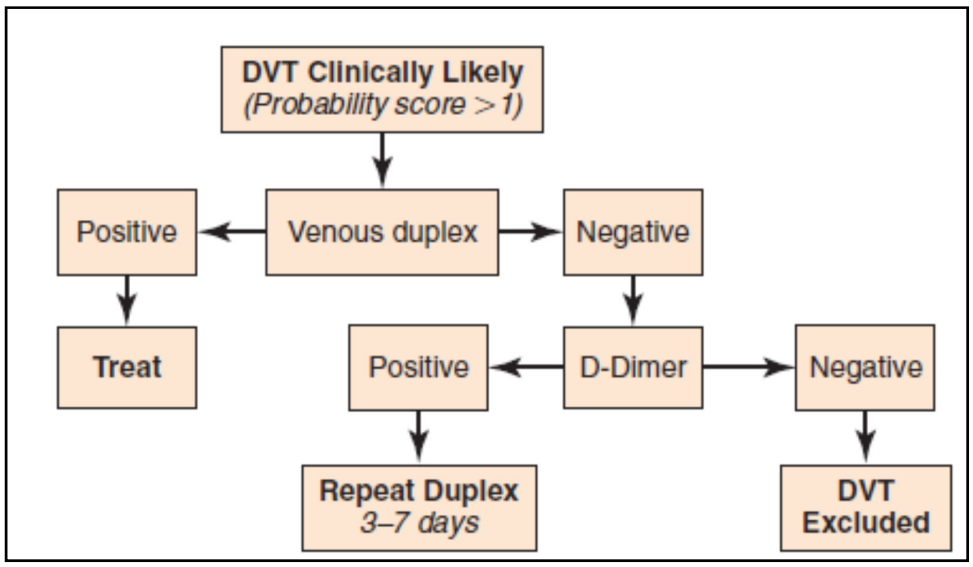
Patients may have signs of cyanosis, dyspnoea, raised neck veins, a fixed split second heart sound and a pleural rub if they are having pulmonary emboli causing right heart strain, although these signs may be subtle or lacking.

MODIFIED WELLS SCORING

Table 1

Modified Wells Criteria: Clinical Evaluation Table for Predicting the Probability of a DVT

Clinical Characteristic(s)	Score
Active cancer	+1
Paralysis, paresis, or recent plaster immobilization of the lower extremities	+1
Recently bedridden for three days or major surgery within the last 12 weeks	+1
Localized tenderness along the deep venous system	+1
Entire leg swollen	+1
Calf swelling ≥ 3 cm larger than asymptomatic side	+1
Pitting edema confined to symptomatic leg	+1
Collateral superficial veins	+1
Previously documented DVT	+1
Alternative diagnosis at least as likely as a DVT	-2
Clinical Probability of DVT	**Total Score**
Likely	< 2
Unlikely	≥ 2



Diagnostic algorithm for evaluation of symptomatic patients with high probability of deep venous thrombosis

Vascular Lab and Radiologic Evaluation

Duplex Ultrasound DUS is now the most commonly performed test for the detection of infrainguinal DVT, both above and below the knee, and has a sensitivity and specificity of >95% in symptomatic patients.3 DUS refers to the combination of real-time B-mode ultrasound with pulsed Doppler capability.

For VTE detection, color flow imaging is an extremely useful adjunct in the evaluation of possible calf vein DVT and evaluation of intra-abdominal veins. DUS provides the ability to noninvasively visualize venous anatomy, detect occluded and partially occluded venous segments, and demonstrate physiologic flow characteristics using a mobile self-contained device.

In the supine patient, normal lower extremity venous flow is phasic , decreasing with inspiration in response to increased intra-abdominal pressure with the descent of the diaphragm and then increasing with expiration as the diaphragm rises and intra-abdominal pressure decreases. When the patient is upright, the decrease in intra-abdominal pressure with expiration cannot overcome the hydrostatic column of pressure existing between the right atrium and the calf. Muscular contractions of the calf, along with the one-way venous valves, are then required to promote venous return to the heart. Flow also can be increased by leg elevation or compression and decreased by sudden elevation of intra-abdominal pressure (Valsalva maneuver).

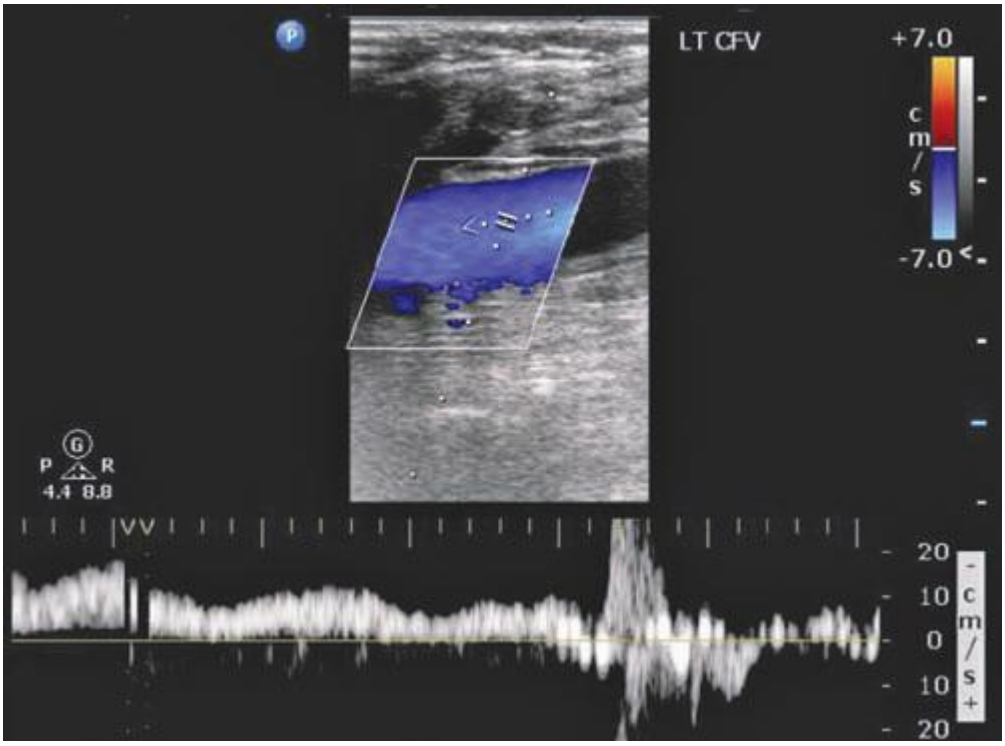
In a venous DUS examination performed with the patient supine, spontaneous flow, variation of flow with respiration, and response of flow to

Valsalva maneuver are all assessed. From the common femoral through the popliteal vein, the primary method of detecting DVT with ultrasound is demonstration of the lack of compressibility of the vein with probe pressure on B-mode imaging.

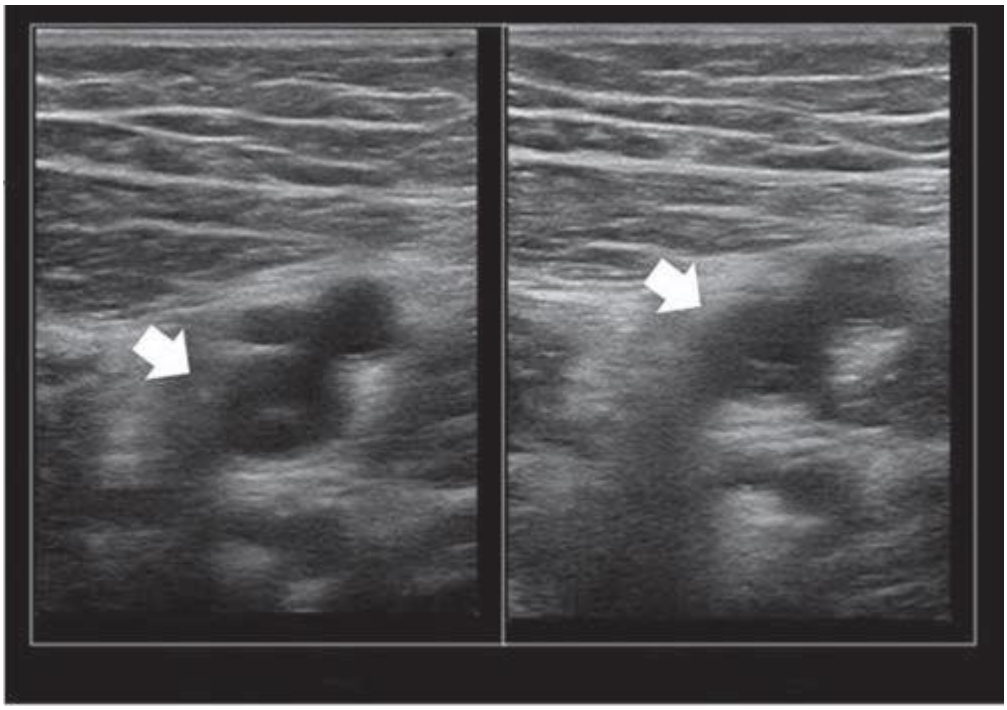
Normally, in transverse section, the vein walls should coapt with pressure. Lack of coaptation indicates thrombus. Calf vein thrombi are often best detected by abnormalities in color flow imaging.The examination begins at the ankle and continues proximally to the groin. Each vein is visualized, and the flow signal is assessed with distal and proximal compression.

Lower extremity DVT can be diagnosed by any of the following DUS findings:

- lack of spontaneous flow
- inability to compress the vein ,
- absence of color filling of the lumen by color flow DUS,
- loss of respiratoryflow variation, and venous distention.
- lack ofvenous compression on B-mode imaging is the primary diagnostic variable.



Duplex ultrasound scan of a normal femoral vein with phasic flow signals.



B-mode ultrasound of the femoral vein in cross-section. The femoral vein does not collapse with external compression (arrows).

Impedance Plethysmography:

Impedance plethysmography (IPG) was the primary noninvasive method of diagnosing DVT before the widespread use of DUS but is infrequently used today. Changes in electrical resistance resulting from lower extremity blood volume changes are quantified. IPG is less accurate than DUS for the detection of proximal DVT, with 83% sensitivity in symptomatic patients. It is a poor detector of calf vein DVT.

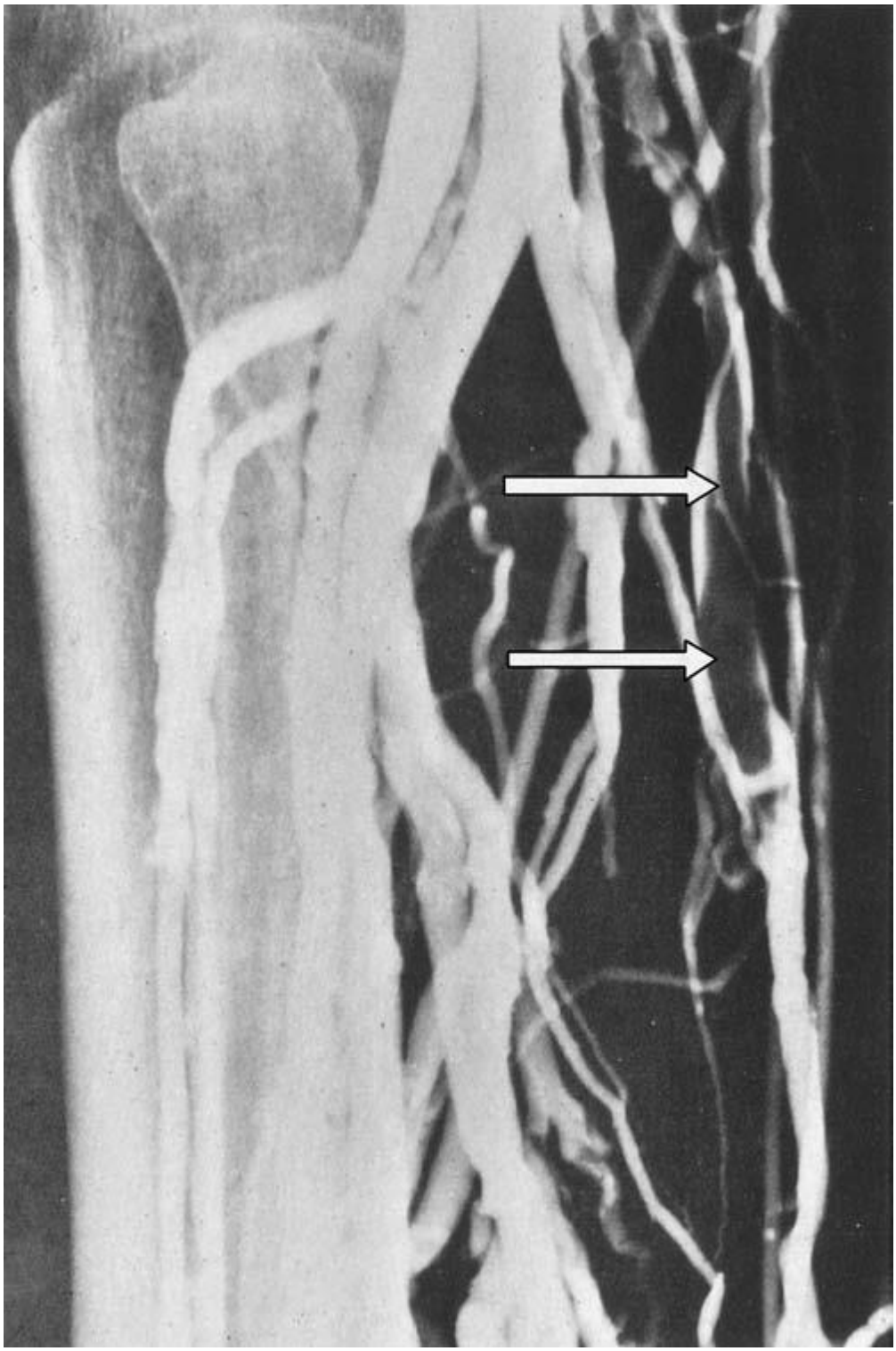
Iodine-125 Fibrinogen Uptake

Iodine-125 fibrinogen uptake (FUT) is a seldom used technique that involves IV administration of radioactive fibrinogen and monitoring for increased uptake in fibrin clots. An increase of 20% or more in one area of a limb indicates an area of thrombus. FUT can detect DVT in the calf, but high background radiation from the pelvis and the urinary tract limits its ability to detect proximal DVT. It also cannot be used in an extremity that has recently undergone surgery or has active inflammation. In a prospective study, FUT had a sensitivity of 73% and specificity of 71% for identification of DVT in a group of symptomatic and

asymptomatic patients. Currently, FUT is primarily a research tool of historic interest.

Venography :

Venography is the gold standard to which other diagnostic modalities are compared. A small catheter is placed in a dorsal foot vein with injection of a radiopaque contrast agent. Radiographs are obtained in at least two projections. A positive study result is failure to fill the deep system with passage of the contrast medium into the superficial system or demonstration of discrete filling defects. A normal study result virtually excludes the presence of DVT. Venography is not routinely used in clinical practice due to invasiveness and complication risk. It is still, however, frequently used in researchstudies evaluating DVT prophylaxis.



VENOGRAPHY

Prophylaxis

Patients who undergo major general surgical, gynecologic, urologic, and neurosurgical procedures without thrombo prophylaxis have a significant incidence of peri operative DVT. An estimated one third of the 150,000 to 200,000 VTE-related deaths per year in the United States occur following surgery. The goal of prophylaxis is to reduce the mortality and morbidity associated with VTE. The first manifestation of VTE may be a life-threatening , and as indicated earlier, clinical evaluation to detect DVT before PE is unreliable.

Effective methods of VTE prophylaxis involve the use of one or more pharmacologic or mechanical modalities.

Currently available pharmacologic agents include low-dose

- UFH,
- LMWH,
- synthetic pentasaccharides,
- vitamin K antagonists.

Mechanical methods include

- intermittent pneumatic compression (IPC)
- graduated compression stockings

There is insufficient evidence to consider aspirin alone as adequate DVT prophylaxis. Methods of prophylaxis vary with regard to efficacy, and the 2012 ACCP Clinical Practice Guidelines stratify their uses according to the patient's level of VTE risk, bleeding risk, and the values and preferences of individual patients.

Venous Thromboembolism Prophylaxis in Nonorthopedic Surgery.

The risk for VTE associated with a surgical procedure depends on the type of operation, type of anesthesia, duration of surgery, and other risk factors, such as patient age, presence of cancer, prior VTE, obesity, presence of infection, and known thrombophilic disorders. VTE risk can be stratified according to the previously mentioned risk assessment models, the Caprini score and Rogers score. These risk assessment models are included in the prophylaxis guidelines for nonorthopedic surgery.

A composite score is created using assigned values for each risk factor. The cumulative score for each patient is then used to predict thrombosis risk and provide recommendations regarding VTE prophylaxis.

Patients at very low risk (<0.5%; Rogers score <7; Caprini score 0) who undergo general or abdominopelvic procedures do not require pharmacologic or mechanical prophylaxis; however, early ambulation is required.

Patients at low risk (<1.5%; Rogers score 7–10; Caprini score 1–2) should receive mechanical prophylaxis.

Patients at moderate risk (3%; Rogers score >10; Caprini score 3–4) should receive LMWH at recommended doses, low-dose UFH, or mechanical prophylaxis.

Patients at high risk (6%; Caprini score ≥5) should receive LMWH at recommended doses or low-dose UFH and mechanical prophylaxis.

Thromboprophylaxis should continue until discharge, except in select high-risk patients with malignancy in whom extended-duration prophylaxis (up to 4–6 weeks) may be beneficial. Patients with significant risk for bleeding should receive mechanical prophylaxis until this risk subsides. Overall, low-dose UFH

and LMWH reduce the risk for symptomatic and asymptomatic VTE by 60% to 70%. The risks for bleeding differ, depending on the dosage. Lower dosages of LMWH appear to be associated with less bleeding risk than low-dose UFH, but the latter produces less bleeding risk than higher prophylactic dosages of LMWH. Other advantages of LMWH include once-daily dosing protocols and a lower rate of heparin-associated antibody formation.

Fondaparinux has been compared with the LMWH dalteparin in patients who undergo high-risk major abdominal surgery. It also has been compared with IPC alone in patients undergoing non–high-risk abdominal surgery. Fondaparinux demonstrated rates of VTE prevention, bleeding complications,and mortality similar to those of LMWH. It was more beneficial than IPC alone in reducing VTE but with a higher rate of bleeding.

Prophylactic insertion of IVC filters has been suggested for VTE prophylaxis in high-risk trauma patients, bariatric surgical patients, and some patients with malignancy who have contraindications for LMWH therapy Fatal and nonfatal PE can still occur in patients with vena cava interruption. As noted earlier, long-term complications associated with permanent IVC filters include IVC thrombosis and DVT. Currently, the ACCP recommends IVC filters be placed only

if a proximal DVT is present and anticoagulation therapy is contraindicated. IVC filter insertion is not recommended for primary prophylaxis. Removable IVC filters may be placed in patients with a temporarily increased risk of PE. The best patient groups for retrievable filter placement may include young trauma patients with transient immobility, patients undergoing surgical procedures associated with a high risk of PE, and patients with hypercoagulable states who cannot receive anticoagulation therapy for a short period of time.

Careful follow-up is required to assure all potentially removable filters are in fact removed.

Risk assessment model from the Patient Safety in Surgery Study

RISK FACTOR	RISK SCORE POINTS
Operation type other than endocrine	
Respiratory and hernia	9
Thoracoabdominal aneurysm, embolectomy/thrombectomy, venous reconstruction and endovascular repair	7
Aneurysm	4
Mouth, palate	4
Stomach, intestines	4
Integument	3
Hernia	2
ASA, physical status classification	
3,4, or 5	2
2	1
Female sex	1
Work RVU	
>17	3
10–17	2
Two points for each of these conditions	2
Disseminated cancer	
Chemotherapy for malignancy within 30 days of operation	
Preoperative serum sodium >145 mmol/L	
Transfusion >4 units packed RBCs in 72 hours before operation	
Ventilator dependent	
One point for each of these conditions	1
Wound class (clean/contaminated)	
Preoperative hematocrit ≤38%	
Preoperative bilirubin >1 mg/dL	
Dyspnea	
Albumin ≤3.5 mg/dL	
Emergency	
Zero points for each of these conditions	0
ASA physical class of 1	
Work RVU <10	
Male sex	

CAPRINI SCORE

- The Caprini risk assessment model was utilized to score individual patients based on co-morbidities and peri-operative risk factors.
- In this model, each independent risk factor is associated with specific points ranging from 1 to 5, based on the risk for DVT for each factor.
- A total risk factor score is calculated which corresponds to the risk of developing DVT.

Caprini risk assessment model

1 POINT	2 POINTS	3 POINTS	5 POINTS
Age 41–60	Age 61–74	Age ≥75	Stroke (<1 month)
Minor surgery	Arthroscopic surgery	History of VTE	Elective arthroplasty
BMI >25 kg/m^2	Major open surgery (>45 minutes)	Family history of VTE	Hip, pelvis, or leg fracture
Swollen legs	Laparoscopic surgery (>45 minutes)	Factor V Leiden	Acute spinal cord injury (<1 month)
Varicose veins	Malignancy	Prothrombin 20210A	
Pregnancy or postpartum	Confined to bed (>72 hours)	Lupus anticoagulant	
History of unexplained or recurrent spontaneous abortion	Immobilizing plaster cast	Anticardiolipin antibody	
Oral contraceptives of hormone replacement	Central venous access	Elevated serum homocysteine	
Sepsis (<1 month)		Heparin-induced thrombocytopenia	
Serious lung disease, including pneumonia (<1 month)		Other congenital or acquired thrombophilia	
Abnormal pulmonary function test			
Acute myocardial infarction			
Congestive heart failure			
History of inflammatory bowel disease			
Medical patient at bed rest			

Thromboembolism risk and recommended thromboprophylaxis in surgical patients

LEVEL OF RISK	APPROXIMATE DVT RISK WITHOUT THROMBOPROPHYLAXIS (%)	SUGGESTED THROMBOPROPHYLAXIS OPTIONS
Very low risk General or abdominopelvic surgery	<0.5% (Rogers score <7; Caprini score 0)	No specific thromboprophylaxis Early ambulation
Low risk General or abdominopelvic surgery	~1.5% (Rogers score 7–10; Caprini score 1–2)	Mechanical prophylaxis
Moderate risk General or abdominopelvic surgery	~3.0% (Rogers score >10; Caprini score 3–4)	LMWH (at recommended doses), LDUH, or mechanical prophylaxis
High bleeding risk		Mechanical prophylaxis
High risk General or abdominopelvic surgery	~6% (Caprini score ≥5)	LMWH (at recommended doses), fondaparinux and mechanical prophylaxis
High bleeding risk General or abdominopelvic surgery for cancer		Mechanical thromboprophylaxis Extended-duration LMWH (4 weeks)

Treatment

Once the diagnosis of VTE has been made, antithrombotic therapy should be initiated promptly. If clinical suspicion for DVT is high, it may be prudent to start treatment while the diagnosis is objectively confirmed. The goals of DVT treatment are the prevention of mortality and morbidity associated with PE and the prevention of the postthrombotic syndrome (PTS).

Treatment regimens may include

- Antithrombotic therapy
- Temporary or permanent vena cava filter placement
- Catheter-directed or systemic thrombolytic therapy
- Operative thrombectomy.

Antithrombotic Therapy.

It is initiated with IV or subcutaneous (SC) unfractionated heparin or SC low molecular weight heparin. Fondaparinux, a synthetic pentasaccharide, is sometimes also used as an alternative. An oral vitamin K antagonist, usually sodium warfarin, is begun shortly after initiation of IV or SC therapy. Either SC or IV therapy is continued until effective oral anticoagulation with warfarin is achieved as indicated by an international normalized ratio (INR) ≥2 for 24 hours.

A minimum of 5 days of heparin or fondaparinux therapy is recommended. UFH therapy is most commonly administered with an initial IV bolus of 80 units/kg followed by a continuous IV drip at 18 units/kg per hour. The level of antithrombotic therapy should be monitored every 6 hours using the activated partial thromboplastin time (aPTT), with the goal range of 1.5 to 2.5 times control

values. Hemorrhage is the primary complication of UFH therapy. The rate of major hemorrhage (fatal, intracranial, retroperitoneal, or requiring transfusion of >2 units of packed red blood cells) is approximately 5% in hospitalized patients.

For patients with UFH-related bleeding complications, cessation of UFH is required, and anticoagulation may be reversed with protamine sulfate. Side effects of protamine sulfate include hypotension, pulmonary edema, and anaphylaxis. Heparin-induced thrombocytopenia (HIT) results from heparin-associated antiplatelet antibodies (HAAbs) directed against platelet factor 4 complexed with heparin.

HIT may lead to disastrous venous or arterial thrombotic complications. Platelet counts should be monitored periodically in patients receiving continuous heparin therapy. HIT is diagnosed based on previous exposure to heparin, platelet count less than 100,000, and/or platelet count decline of 50% following exposure. All heparin must be stopped and alternative anticoagulation initiated immediately to avoid thrombotic complications.

Another complication of prolonged high-dose heparin therapy is osteopenia. Heparin-induced osteopenia results from impairment of bone formation and enhancement of bone resorption by heparin.

Low molecular weight heparins (LMWHs)

are derived from the depolymerization of porcine UFH. Like UFH, LMWHs bind to antithrombin via a specific pentasaccharide sequence to expose an active site for the neutralization of factor Xa. SC LMWH injections do not require laboratory monitoring for anticoagulant effect, a distinct advantage over continuous IV infusions of UFH. There are numerous LMWHs available,
and the various preparations differ in their anti-Xa and anti-IIa activities.
Several meta-analyses and demonstrate a decrease in thrombotic complications, bleeding, and mortality with LMWHs. LMWHs also are associated with a decreased rate of HAAb formation and HIT (<2%) compared with UFH

FONDAPARINUX

currently is a synthetic pentasaccharide that has been approved by the FDA for the initial treatment of DVT and PE.

The drug is administered SC once daily with a weight-based dosing protocol: 5 mg, 7.5 mg, or 10 mg for patients weighing <50 kg, 50 to 100 kg, or >100 kg, respectively. The half-life of fondaparinux is approximately 17 hours in patients with normal renal function.

Direct thrombin inhibitors (DTIs*)*

- include recombinant hirudin,
- argatroban,
- bivalirudin.

These antithrombotic agents bind to thrombin, inhibiting the conversion of fibrinogen to fibrin as well as thrombin-induced platelet activation.

***Vitamin K antagonists**,*

which include warfarin and other coumarin derivatives, are the mainstay of long-term antithrombotic therapy in patients with VTE. Warfarin inhibits the γ-carboxylation of vitamin K–dependent procoagulants (factors II, VII, IX, and X) and anticoagulants (proteins C and S), resulting in formation of less functional proteins. Warfarin 5 to 10 mg. usually requires several days to achieve full effect because normal circulating coagulation proteins must first undergo their normal

degradation. A steady-state concentration of warfarin is usually not reached for 4 to 5 days.

Warfarin therapy is monitored by measuring the INR The therapeutic target INR range is usually 2.0 to 3.0.The recommended duration of warfarin antithrombotic therapy is stratified based on whether the DVT was provoked or unprovoked, whether it was the first or a recurrent episode, where the DVT is located, and whether malignancy or thrombophilia is present.

The ACCP recommendation is that 3 months of anticoagulation are sufficient to prevent recurrent VTE in patients with DVT occurring around the time of a transient risk factor (e.g., hospitalization, orthopedic or major general surgery). In patients with idiopathic DVT, extended-duration antithrombotic therapy is associated with a relative reduction in the rate of recurrent VTE by 75% to >90%.

Warfarin therapy rarely may be associated with the development of skin necrosis and limb gangrene more commonly in women (4:1). The most commonly affected areas are the breast, buttocks, and thighs.

Systemic and Catheter-Directed Thrombolysis.

Patients with extensive proximal, iliofemoral DVT may benefit from systemic thrombolysis or catheter-directed thrombolysis (CDT).CDT appears to be more effective and potentially reduces acute congestive lower extremity symptoms more rapidly than anticoagulation alone and decreases the development of PTS. Several thrombolytic agents are available,

- Streptokinase,
- Urokinase,
- Alteplase (Recombinant Tissue Plasminogen Activator),
- Reteplase,
- Tenecteplase.

All share the ability to convert plasminogen to plasmin, which leads to the degradation of fibrin. They differ with regard to their half-lives, their potential for inducing fibrinogenolysis (generalized lytic state), their potential for antigenicity, and their FDA-approved indications for use. It is not specific for fibrin-bound

plasminogen, however, and its use is limited by its significant rates of antigenicity. Fevers and shivering occur in 1% to 4% of patients.

Urokinase is derived from human neonatal kidney cells grown in tissue culture. Currently, it is only approved for lysis of massive PE or PE associated with unstable hemodynamics.

Alteplase, reteplase, and tenecteplase all are recombinant variants of tissue plasminogen activator. Alteplase is indicated for the treatment of acute myocardial infarction, acute ischemic stroke, and acute massive PE. However, it often is used for CDT of DVT.

In an effort to minimize bleeding complications and increase efficacy, CDT techniques were developed for the treatment of symptomatic primarily iliofemoral DVT. With catheter-directed therapy, venous access may be achieved through percutaneous catheterization of the ipsilateral popliteal vein, retrograde catheterization through the contralateral femoral vein, or retrograde cannulation from the internal jugular vein. Multi-side-hole infusion catheters, with or without infusion wires, are used to deliver the lytic agent directly into the thrombus. Lytic agents may be administered alone or, now more commonly, in combination with

catheter-based methods to physically break up the clot—so-called pharmacomechanical thrombolysis.

Inferior Vena Caval Filters.

Numerous vena caval filters have been developed. Although the designs are variable, they all prevent pulmonary emboli, while allowing continuation of venous blood flow through the IVC. Early filters were placed surgically through the femoral vein. Currently, less invasive techniques allow percutaneous filter placement through a femoral vein, internal jugular vein, or small peripheral vein under fluoroscopic or ultrasound guidance.

Placement of an IVC filter is indicated

- for patients who have manifestations of lower extremity VTE and absolute contraindications to anticoagulation,
- those that have a bleeding complication from anticoagulation therapy of acute VTE,
- those who develop recurrent DVT or PE despite adequate anticoagulation therapy
- patients with severe pulmonary hypertension.

When possible, therapy should be continued in patients with vena cava filters. The duration of anticoagulation is determined by the underlying VTE and not by the presence of the IVC filter itself. Practically speaking, however, many patients who require an IVC filter for recurrent VTE are the same ones who would benefit most from indefinite anticoagulation. In patients who are not able to receive anticoagulants due to recent surgery or trauma, the clinician should continually reassess if anticoagulation may be started safely at a later date.

Placement of permanent IVC filters has been evaluated as an adjunct to routine anticoagulation in patients with proximal DVT.Routine IVC filter placement has not been shown to prolong early or late survival in patients with proximal DVT but did decrease the rate of PE , however; an increased rate of recurrent DVT was seen in patients with IVC filters .

IVC filters are associated with acute and late complications. Acute complications include

- thrombosis or bleeding at the insertion site
- misplacement of the filter.

Late complications include

- thrombosis of the IVC,
- DVT,
- breaking,
- migration, or
- erosion of the filter through the IVC.

The rate of fatal complications is <0.12%. In some patients, the need for an IVC filter may be selflimited. Such patients can be treated with so-called removable IVC filters. Depending on the device, removable IVC filters are potentially removable by percutaneous endovascular techniques for up to several months after their initial implantation assuming the filter is no longer required and does not have large amounts of trapped thrombi. All temporary IVC filters are approved for permanent implantation, and many so-called temporary filters end up as permanent devices with all the potential complications of permanent IVC filters.

Operative Venous Thrombectomy.

In patients with acute iliofemoral DVT, surgical therapy is generally reserved for patients who worsen with anticoagulation therapy and those with

phlegmasia cerulea dolens and impending venous gangrene. If the patient has phlegmasia cerulea dolens, a fasciotomy of the calf compartments is first performed. In iliofemoral DVT, a longitudinal venotomy is made in the common femoral vein and a venous balloon embolectomy catheter is passed through the thrombus into the IVC and pulled back several times until no further thrombus can be extracted. The distal thrombus in the leg is removed by manual pressure beginning in the foot. This is accomplished by application of a tight rubber elastic wrap beginning at the foot and extending to the thigh. If the thrombus in the femoral vein is old and cannot be extracted, the vein may be ligated. For a thrombus that extends into the IVC, the IVC is exposed transperitoneally and controlled below the renal veins.

The IVC is opened and the thrombus is removed by gentle massage. An intraoperative completion venogram determines if any residual thrombus or stenosis is present. If a residual iliac vein stenosis is present, intraoperative angioplasty and stenting can be performed. In most cases, an arteriovenous fistula is then created by anastomosing the great saphenous vein (GSV) end to side with the superficial femoral artery in an effort to maintain patency of the thrombectomized iliofemoral venous segment.

Heparin is administered postoperatively for several days. Warfarin anticoagulation is maintained for at least 6 months after thrombectomy.

Complications of iliofemoral thrombectomy include

- PE in up to 20% of patients
- death in <1%of patients.

Survival rates for surgical pulmonary embolectomy have improved over the past 20 years with the addition of cardiopulmonary bypass. Emergency pulmonary embolectomy for acute PE is rarely indicated. Patients with preterminal massive PE for whom thrombolysis has failed or who have contraindications to thrombolytics may be candidates for this procedure. Open pulmonary artery embolectomy is performed through a posterolateral thoracotomy with direct visualization of the pulmonary arteries. Mortality rates range between 20% and 40%.

Percutaneous catheter-based techniques for removal of a PE involve mechanical thrombus fragmentation or embolectomy using suction devices. Mechanical clot fragmentation is followed by CDT.

PROGNOSIS

The most frequent complication of proximal DVT is post-thrombotic syndrome, which is caused by a reduction in the return of venous blood to the heart. Some symptoms of post-thrombotic syndrome are pain, edema, paresthesia, and in severe cases, leg ulcers. An estimated 20–50% of those with DVT will develop it, and 5–10% will develop the severe form. PE is the most serious complication of proximal DVT, and the risk of PE is higher when clots are present in the thigh and pelvis. Distal DVT itself is hardly if ever associated with post-thrombotic syndrome or PE. Untreated lower extremity DVT has a 3% PE-related mortality rate, while deaths associated with upper extremity DVT are extremely rare. The presence of a remaining thrombus after a DVT frequently occurs in a minority of people, and it increases the risk of recurrence, though to a lesser extent than an elevated D-dimer. In the 10 years following a DVT, approximately a third of individuals will have a recurrent episode.

AIM & OBJECTIVES :

To determine the incidence, morbidity and mortality due to Deep Vein Thrombosis in surgical patients, and to assess the validity and reliability of Adapted Caprini scoring in risk stratification for DVT prophylaxis.

METHODS AND MATERIAL

1. **DESIGN OF STUDY** **:** Prospective observation Study

2. **PERIOD OF STUDY** **:** 1 year (Oct 2016 to Sep 2017)

3. **COLLABORATING DEPARTMENT :** None

4. **SELECTION OF STUDY SUBJECTS :** All patients satisfying inclusion criteria admitted in General Surgery Department, Government Rajaji Hospital for a period of 1 year

5. **DATA COLLECTION** **:** All patients undergoing either elective or emergency operations under regional or general anesthesia in general surgery department coming under eligibility criteria will be stratified for risk of developing DVT using Adapted Caprini Scoring System.

6. **METHODS** **:** Prospective Observation Study

7. **ETHICAL CLEARANCE** **:** Applied for approval

8. **CONSENT** **:** Individual written and Informed consent

9. ANALYSIS **:** Statistical Analysis

10.CONFLICT OF INTEREST **:** None

11.**FINANCIAL SUPPORT** **:** Nil From The Institution

12.**PARTICIPANTS** **:** Patients from Casualty and OPD

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RESEARCH PROPOSAL

ELIGIBILITY CITERIA:

INCLUSION CRITERIA

1. All Patients undergoing either elective or emergency operations under regional or general anesthesia in the department of general surgery.

EXCLUSION CRITERIA

1. Patients who were diagnosed as having DVT at the time of admission.
2. Patients on anticoagulant treatment for any reason.
3. Patients planned for lower limb vascular interventions.
4. Patients in whom anticoagulation therapy was contraindicated due to any reason.
5. Patients on antiplatelet drugs.

METHODOLOGY

MATERIALS AND METHODS:

SOURCE OF DATA:

All patients satisfying inclusion criteria admitted in General Surgery Department, Government Rajaji Hospital for a period of 1 year

METHOD OF COLLECTION OF DATA:

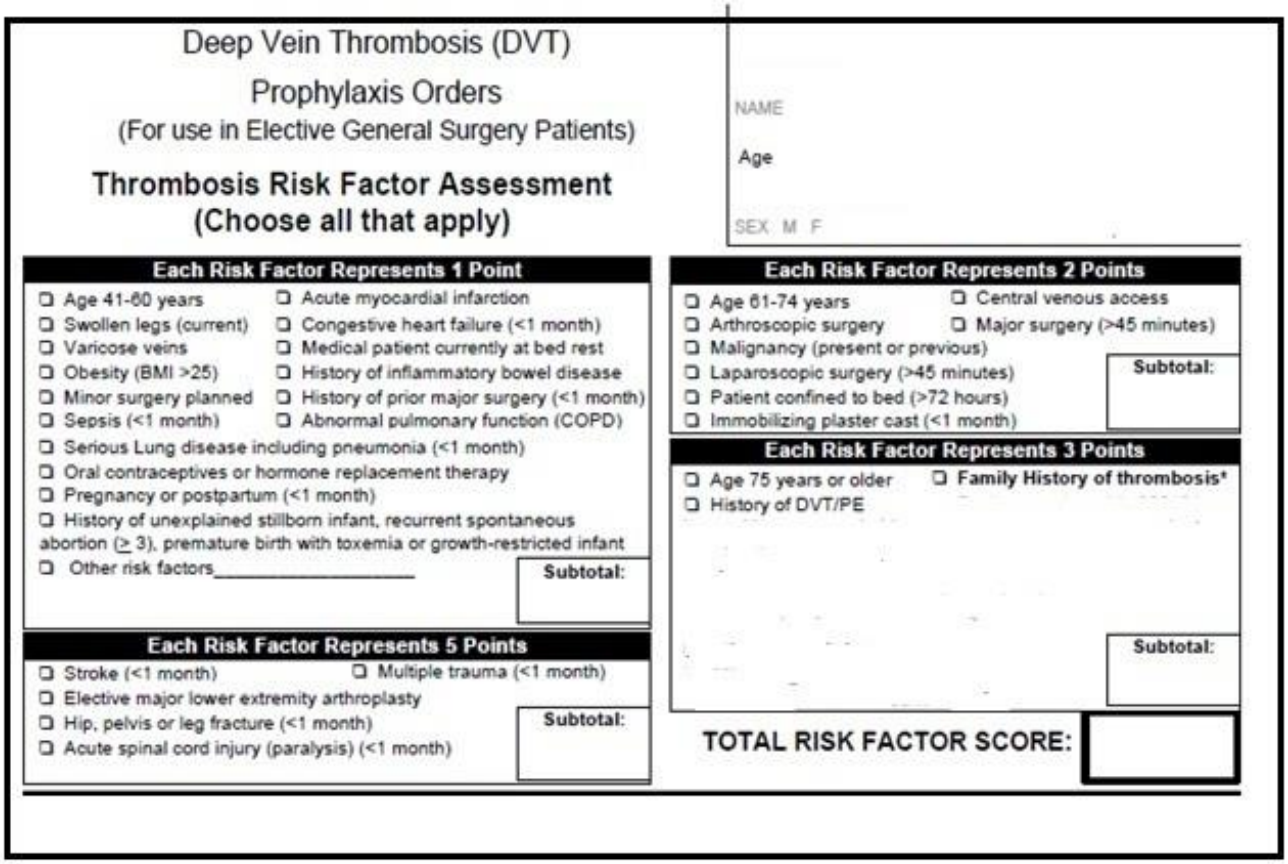
All patients undergoing either elective or emergency operations under regional or general anesthesia in general surgery department coming under eligibility

criteria will be stratified for risk of developing DVT using Adapted Caprini Scoring System.

DATA ANALYSIS

Using statistical analysis

ADAPTED CAPRINI SCORING SYSTEM



Deep Vein Thrombosis (DVT)

Prophylaxis Orders

(For use in Elective General Surgery Patients)

Thrombosis Risk Factor Assessment
(Choose all that apply)

NAME

Age

SEX M F

Each Risk Factor Represents 1 Point

- ❑ Age 41-60 years
- ❑ Swollen legs (current)
- ❑ Varicose veins
- ❑ Obesity (BMI >25)
- ❑ Minor surgery planned
- ❑ Sepsis (<1 month)
- ❑ Acute myocardial infarction
- ❑ Congestive heart failure (<1 month)
- ❑ Medical patient currently at bed rest
- ❑ History of inflammatory bowel disease
- ❑ History of prior major surgery (<1 month)
- ❑ Abnormal pulmonary function (COPD)
- ❑ Serious Lung disease including pneumonia (<1 month)
- ❑ Oral contraceptives or hormone replacement therapy
- ❑ Pregnancy or postpartum (<1 month)
- ❑ History of unexplained stillborn infant, recurrent spontaneous abortion (≥ 3), premature birth with toxemia or growth-restricted infant
- ❑ Other risk factors_____

Subtotal:

Each Risk Factor Represents 2 Points

- ❑ Age 61-74 years
- ❑ Arthroscopic surgery
- ❑ Malignancy (present or previous)
- ❑ Laparoscopic surgery (>45 minutes)
- ❑ Patient confined to bed (>72 hours)
- ❑ Immobilizing plaster cast (<1 month)
- ❑ Central venous access
- ❑ Major surgery (>45 minutes)

Subtotal:

Each Risk Factor Represents 3 Points

- ❑ Age 75 years or older
- ❑ History of DVT/PE
- ❑ **Family History of thrombosis***

Subtotal:

Each Risk Factor Represents 5 Points

- ❑ Stroke (<1 month)
- ❑ Elective major lower extremity arthroplasty
- ❑ Hip, pelvis or leg fracture (<1 month)
- ❑ Acute spinal cord injury (paralysis) (<1 month)
- ❑ Multiple trauma (<1 month)

Subtotal:

TOTAL RISK FACTOR SCORE:

OBSERVATION AND RESULTS

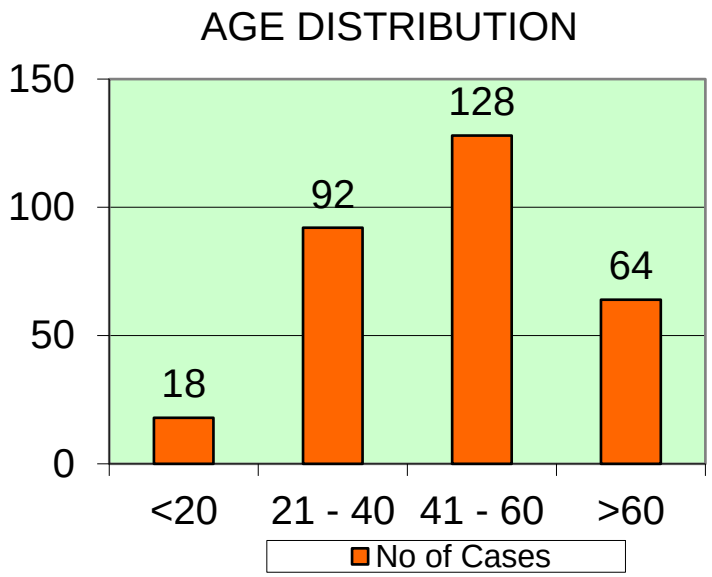
STATISTICAL ANALYSIS

In the study 302 patients were assessed for risk of developing DVT using Adapted Caprini Scoring System and the following results were obtained.

AGE DISTRIBUTION :

Majority of the patients were in the age group 41-60(42.3%) and 30% patients in 21-40 group. Age >60 pts were found to be only 21% of total study size.

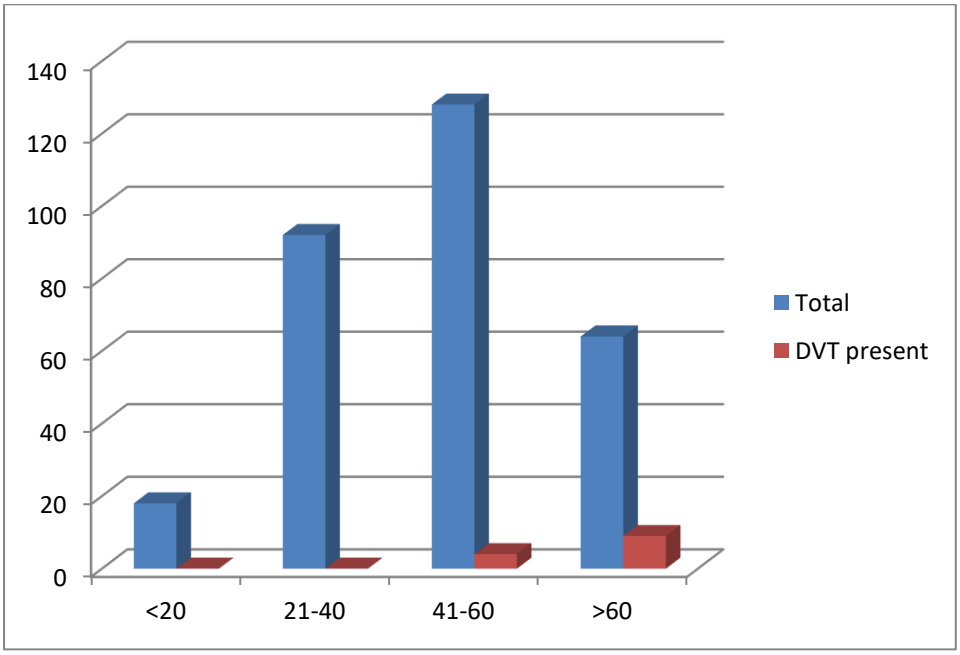
AGE	No of Cases
<20	18
21 - 40	92
41 - 60	128
>60	64
Total	302



AGE GROUP VS DVT:

In this study the occurrence of DVT among the age group of 41 -60 is 3.1%, whereas the occurrence of DVT among the age group >60 is 14%. The lower age groups had no incidence of DVT.

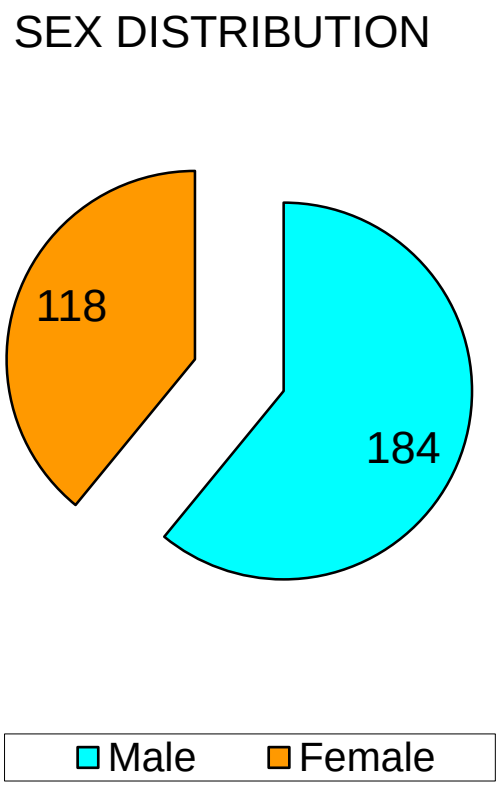
Age	Total	DVT present
<20	18	0
21-40	92	0
41-60	128	4
>60	64	9



SEX DISTRIBUTION

Among the 302 patients studied 184 were males and 118 were females.

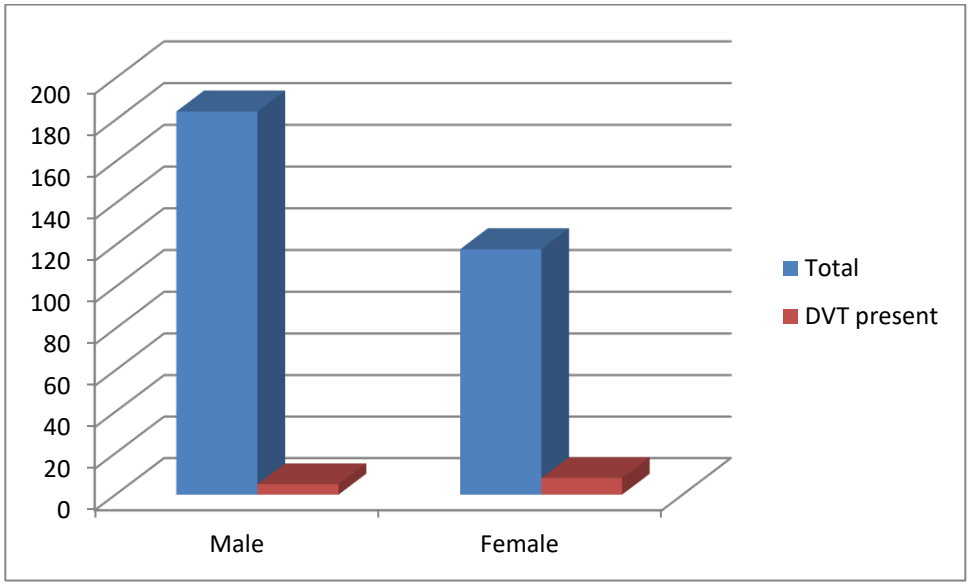
SEX	No of Cases
Male	184
Female	118
Total	302



SEX DISTRIBUTION VS DVT:

Incidence of male patients suffering from DVT among the total study sample was 2.71% and female counterpart was 6.7%. There appears to be around 3 times increased incidence among females when compared to males

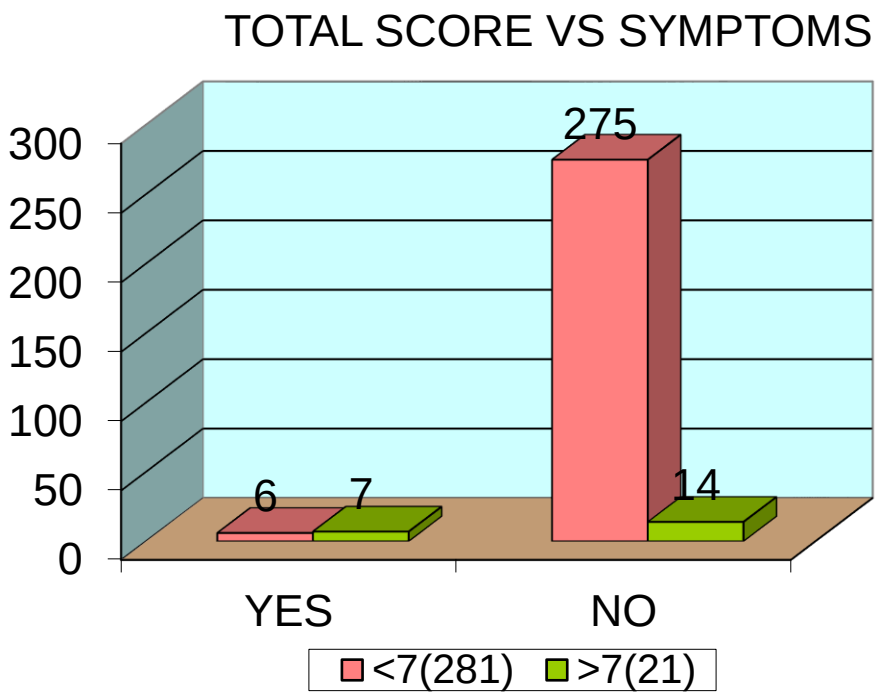
	Total	DVT present
Male	184	5
Female	118	8



SYMPTOMATIC PATIENTS

Among the 302 patients studied only 13 developed symptoms suggestive of DVT like swelling of limb or pain. Only 21 patients were of score >7 and remaining majority were of score <7.

TOTAL SCORE vs SYMPTOMS		
	YES	NO
<7(281)	6	275
>7(21)	7	14
Total	13	289

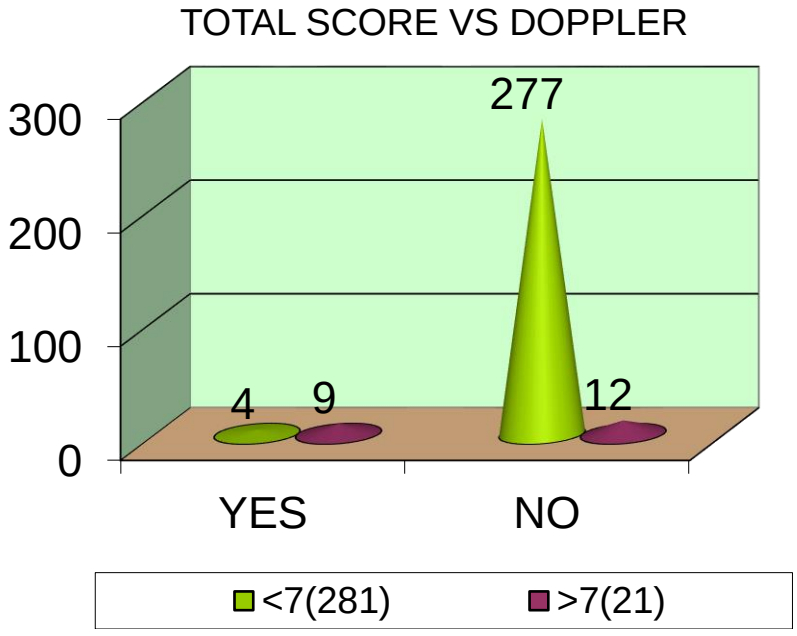


DOPPLER CONFIRMED CASES :

Patients who developed symptoms of DVT(13) were subjected to Doppler study for confirmation of diagnosis. All the 13 patients (4.3%) with symptoms had DVT.

TOTAL SCORE vs DOPPLER		
	YES	NO
<7(281)	4	277
>7(21)	9	12
Total	13	289

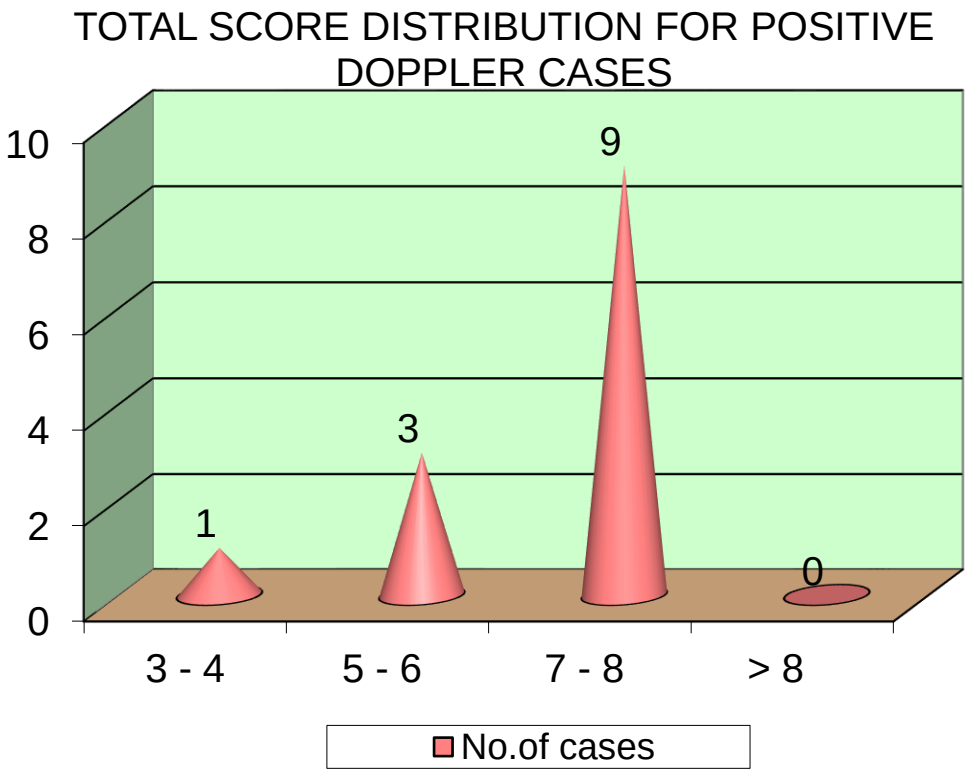
Out of 21 patients with score >7, 9 (42%)were diagnosed of having DVT which is statistically significant (<0.001). And 4 out of 281(1.4%) patients with score <7 had DVT.



SCORE DISTRIBUTION:

No. of positive patients with score 3-4 was 1(7.6%) and score 5-6 was 3 (23%) and score of 7-8 was 9 (69.2%).

Total score	No.of cases
3 - 4	1
5 - 6	3
7 - 8	9
> 8	0
Total	13

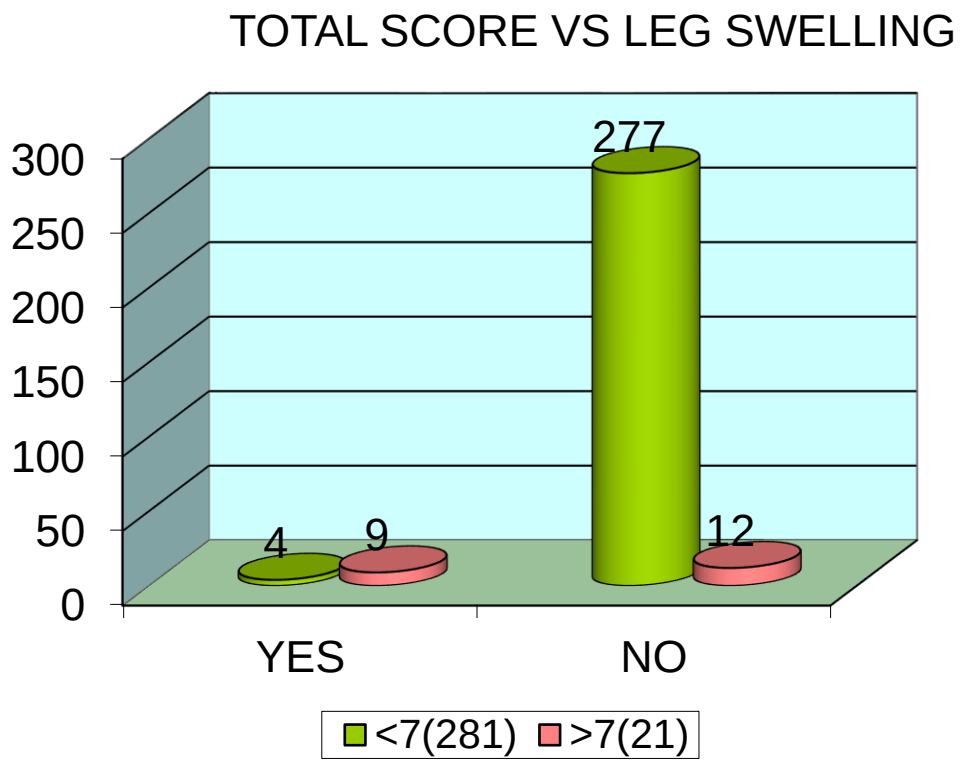


SYMPTOMATOLOGY-

SCORE VS SWELLING

All patients(13) with DVT had swelling of affected limb .

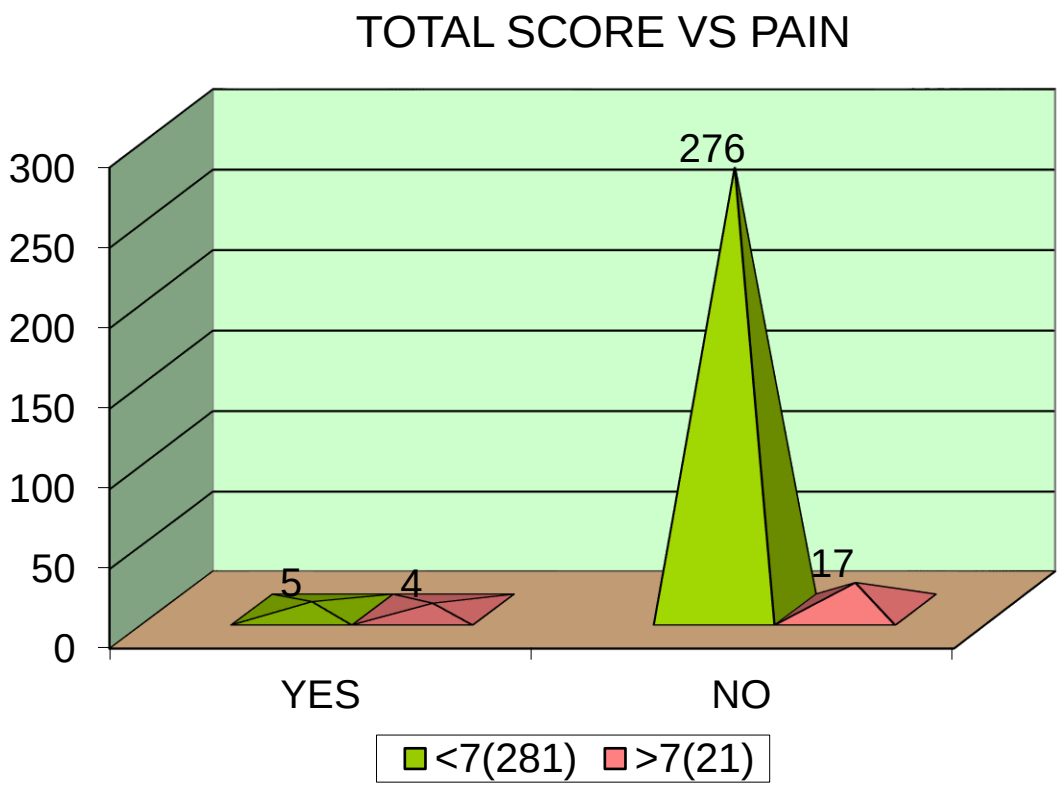
TOTAL SCORE vs LEG SWELLING		
	YES	NO
<7(281)	4	277
>7(21)	9	12
Total	13	289



SCORE VS PAIN

Out of 13 patients only 9 patients had swelling in th leg (69%).

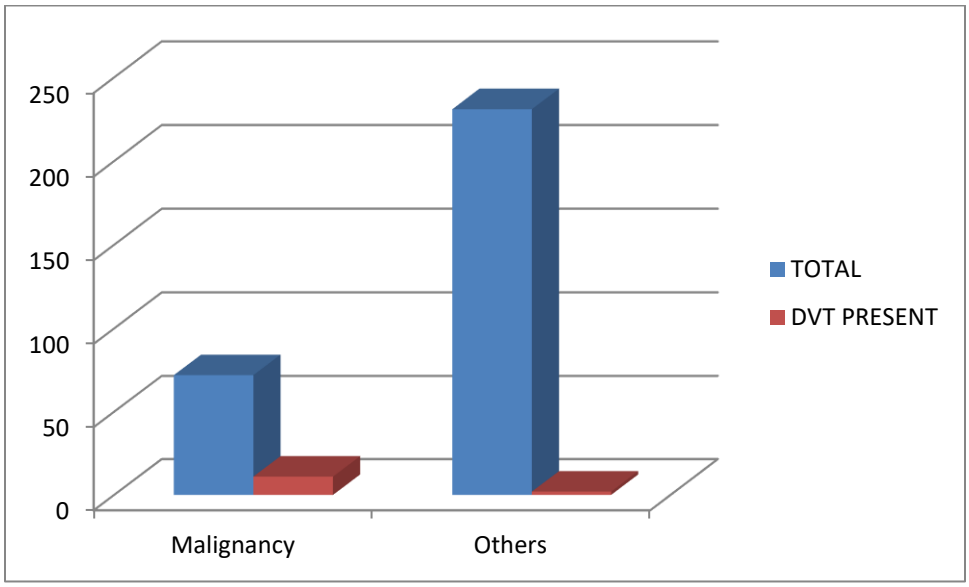
TOTAL SCORE vs PAIN		
	YES	NO
<7(281)	5	276
>7(21)	4	17
Total	9	293



MALIGNANCY VS DVT:

84 %(11 out of 13) of the patients who developed DVT had malignancy. There is a statistical significance between malignancy and occurrence of DVT in this study which is similar to the studies conducted previously

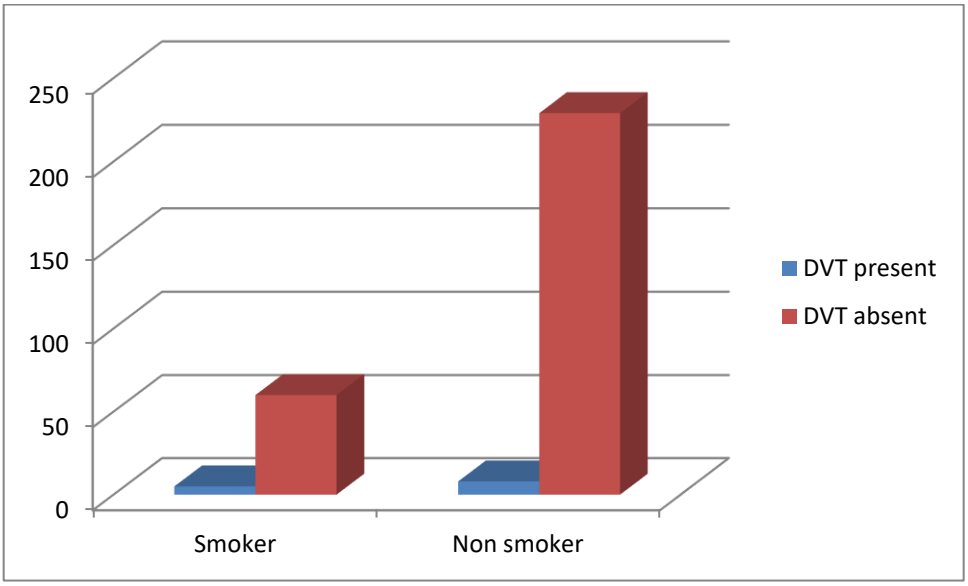
	TOTAL	DVT PRESENT
Malignancy	72	11
Others	231	2



SMOKING VS DVT:

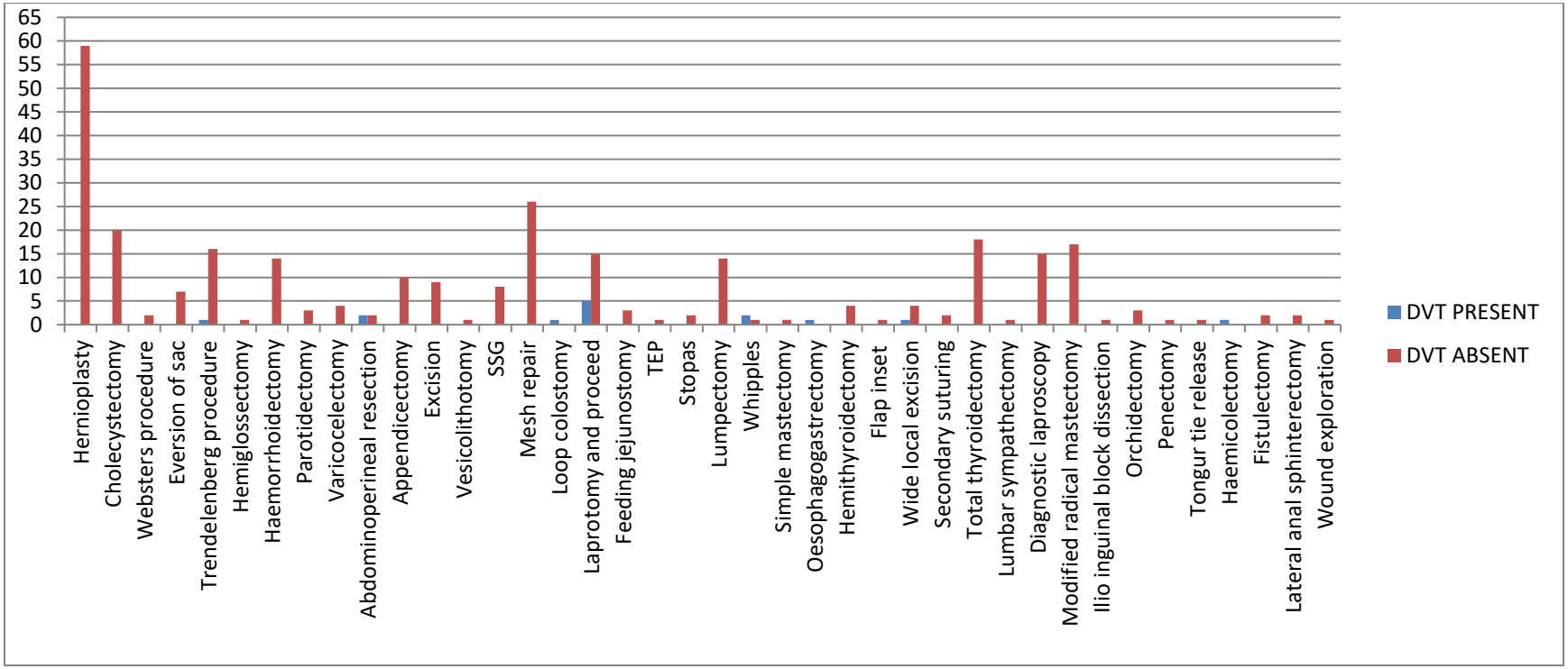
Among 65 smokers 5 developed DVT which corresponds to 7.6%,whereas among the 237 non smokers 8 developed DVT which corresponds to 3.3 %.But the incidence of smoking in DVT positive cases was around 38%.

	DVT present	DVT absent
Smoker	5	60
Non smoker	8	229



TYPES OF SURGERY VS DVT

	DVT PRESENT	DVT ABSENT	total
Hernioplasty	0	59	59
Cholecystectomy	0	20	20
Websters procedure	0	2	2
Eversion of sac	0	7	7
Trendelenberg procedure	1	16	17
Hemiglossectomy	0	1	1
Haemorrhoidectomy	0	14	14
Parotidectomy	0	3	3
Varicocelectomy	0	4	4
Abdominoperineal resection	2	2	4
Appendicectomy	0	10	10
Excision	0	9	9
Vesicolithotomy	0	1	1
SSG	0	8	8
Mesh repair	0	26	26
Loop colostomy	1	0	1
Laprotomy and proceed	5	15	20
Feeding jejunostomy	0	3	3
TEP	0	1	1
Stopas	0	2	2
Lumpectomy	0	14	14
Whipples	2	1	3
Simple mastectomy	0	1	1
Oesophagogastrectomy	1	0	1
Hemithyroidectomy	0	4	4
Flap inset	0	1	1
Wide local excision	1	4	5
Secondary suturing	0	2	2
Total thyroidectomy	0	18	18
Lumbar sympathectomy	0	1	1
Diagnostic laproscopy	0	15	15
Modified radical mastectomy	0	17	17
Ilio inguinal block dissection	0	1	1
Orchidectomy	0	3	3
Penectomy	0	1	1
Tongur tie release	0	1	1
Haemicolectomy	1	0	1
Fistulectomy	0	2	2
Lateral anal sphinterectomy	0	2	2
Wound exploration	0	1	1



From the above chart it was evident that DVT was more common in surgery which required laparotomy and prolonged general anesthesia. These findings were similar to the previous studies conducted earlier.

DISCUSSION

DVT is a relatively common complication among surgical patients, with many risk factors, which contribute to the disease. However, it was found that DVT prophylaxis was not used widely, probably due to limited awareness among the medical fraternity regarding identification of patients at high risk who need prophylaxis. The use of a risk assessment model may help improve the current situation.

The present study intended to validate the adapted Caprini RAM, which can be used to stratify the risk of developing DVT in hospitalized patients based on their individual risk factors. In the present study it was found that a high adapted Caprini score and the cumulative risk level was associated with an increased risk of DVT. The incidence of DVT events in the low and moderate groups was zero. This is contrary to previous data by Caprini et al., which described the incidence in low risk group to be 2%, moderate risk group to be 20%.

The highest group in their study was described as having an incidence of VTE of 80%. In the present study the incidence of VTE among the highest risk group was found to be 84%.

In the original Caprini RAM, all patients with a score >5 were placed in the same group. Bahl et al. modified the Caprini RAM and added a separate “super high risk” group (>8) and recommended an extended duration of chemoprophylaxis for the same. Further splitting the highest risk category patients, it was observed that the difference in incidence of VTE among the patients with adapted Caprini score of 7-8 (69%) was statistically significant ($P < 0.001$), while among the score group of 5-6 it was statistically not significant .

Of all the risk factors listed in the Adapted Caprini RAM, it was found that age,sex, Major surgery, malignancy , patient confined to bed (>72 h), history of DVT/PE were associated with increased risk of DVT. (>45 min) smoking were found to have marginally significant risk. All these factors are well recognized risk factors associated with development of VTE. However, as described in the study by Anderson et al. these risk factors are not of equal weight.

Malignancy was found to be an important risk factor in our study (92%) which is similar to most of the studies and further risk stratification is required regarding the type and stage of cancer. In this study relation between smoking and DVT was not significant

This observation may be due to either insufficient power of the study or because some of these factors may not be significant determinants of DVT risk in the Indian population.

For some of the established parameters like, oral contraceptives or hormone replacement use, pregnancy or postpartum (<1 month), history of still born, heparin induced thrombocytopenia ,stroke (<1 month), multiple trauma (<1 month),major lower limb arthroplasty, acute spinal cord injury, the risk of developing VTE could not be evaluated as there were no patients with these conditions in the present study.

The present study had certain limitations. Firstly, only patients who had symptoms of DVT were evaluated for the same. Routine screening for asymptomatic DVT was not done, which may have resulted in a lesser incidence being reported. Secondly, all the parameters of thrombophilia were not evaluated

on any of the patients and some established risk factors (mentioned above) were not reported in any of the patients in the study group and hence no information could be obtained about these relevant risk factors from the study population. As a result of this, the patients' risk level may be underestimated. Thirdly, no orthopedic cases were included in the study, and hence most of the parameters, which are assigned a high risk scoring of 5 points, were not studied.

CONCLUSION

Deep vein thrombosis is one of the significant, yet preventable causes of in-patient morbidity and mortality. It is important to raise awareness among medical fraternity regarding detection and prevention of the same. The adapted Caprini RAM is an economical, practical and effective tool to stratify general surgical patients for perioperative DVT risk.

Unlike the Western population, the present study found that within the high risk group (score >5), the risk of developing DVT is not significant in the 5-6 score group, as compared to that in the group with a score of >7. Hence further stratification of this group to provide appropriate prophylaxis only to the patients with scores >7 is recommended, thereby reducing complications due to DVT prophylaxis. However, further multicenter and larger scale validation studies for the use of this adapted score in this region population are recommended

ANNEXURE

BIBLIOGRAPHY

[1] R. White, The epidemiology of venous thromboembolism, Circulation 107 (2003) 14e18.

[2] M. Cushman, Epidemiology and risk factors for venous thrombosis, Semin Hematol. 44 (2007) 62e69.

[3] F.A. Spencer, C. Emery, S.W. Joffe, L. Pacifico, D. Lessard, G. Reed, et al., Incidence

rates, clinical profile, and outcomes of patients with venous thromboembolism-The Worcester VTE study, J. Thromb. Thrombolysis 28 (2009)

401e409.

[4] D. Sandler, J. Martin, Autopsy proven pulmonary embolism in hospital patients:

are we detecting enough deep vein thrombosis? J. R. Soc. Med. 82

(1989) 203e205.

[5] B. Lindblad, A. Eriksson, D. Bergqvist, Autopsy-verified pulmonary embolism in a surgical department: analysis of the period from 1951 to 1988, Br. J. Surg. 78 (1991) 849e855.

[6] S. Kwon, M. Meissner, R. Symons, S. Steele, R. Thirlby, R. Billingham, et al.,

Perioperative pharmacologic prophylaxis for venous thromboembolism in colorectal surgery, J. Am. Coll. Surg. 213 (2011) 596e603.

[7] O. Huber, H. Bounameaux, F. Borst, A. Rohner, Postoperative pulmonary embolism after hospital discharge: an underestimated risk, Arch. Surg 127 (1992) 310e313.

[8] A.A. Khorana, C.W. Francis, E. Culakova, N.M. Kuderer, G.H. Lyman, Thromboembolism is a leading cause of death in cancer patients receiving outpatient chemotherapy, J. ThrombHaemost 5 (2007) 632e634.

[9] R.H. White, H. Zhou, P.S. Romano, Incidence of symptomatic venous thromboembolism after different elective or urgent surgical procedures, Thromb. Haemost. 90 (2003) 446e455.

[10] F.J. Fleming, M.J. Kim, R.M. Salloum, K.C. Young, J.R. Monson, How much do we need to worry about venous thromboembolism after hospital discharge? A study of colorectal surgery patients using the National Surgical Quality Improvement Program database, Dis. Colon Rectum. 53 (2010) 1355e1360.

[11] R. Pinjala, ENDORSE-India investigators, Venous thromboembolism risk &

prophylaxis in the acute hospital care setting (ENDORSE) a multinational cross-sectional study: results from the Indian subset data, Indian J. Med. Res. 136 (2012) 60e67.

[12] N. Kakkar, R.K. Vasishta, Pulmonary embolism in medical patients: an autopsy-based study, Clin. Appl. Thromb. Hemost. 14 (2008) 159e167.

[13] S.K. Todi, S. Sinha, A. Chakraborty, A. Sarkar, S. Gupta, T. Das, et al., Utilisation
of deep venous thrombosis prophylaxis in medical/surgical intensive care units, Indian J. Crit. Care Med. 7 (2003) 103e105.

[14] A. Venkataram, S. Santhosh, D. Dinakar, S. Siddappa, R. Babu, S. Shivaswamy,
Postoperative Venous Thromboembolism prophylaxis by general surgeons in a developing country: a survey, Thrombosis 2013 (2013) 873750.

[15] R.R. De Martino, P.P. Goodney, E.L. Spangler, J.B. Wallaert, M.A. Corriere, E.M. Rzucidlo, et al., Variation in thromboembolic complications among patients undergoing commonly performed cancer operations, J. Vasc. Surg. 55 (2012) 1035e1040.

[16] J. Kim, E. Chun, S. Choi, D. Park, H. Kim, S. Bang, et al., A prospective study on
the incidence of postoperative venous thromboembolism in Korean Gastric

cancer patients: an inquiry into the application of Western guidelines to Asian cancer patients, PLoS One 8 (2013) e61968.

[17] O. Jeong, S.Y. Ryu, Y.K. Park, Y.J. Kim, The effect of low molecular weightheparin thromboprophylaxis on bleeding complications after gastric cancer surgery, Ann. Surg. Oncol. 17 (2010) 2363e2369.

[18] J. Laryea, B. Champagne, Venous thromboembolism prophylaxis, Clin. Colon Rectal Surg. 26 (2013) 153e159.

[19] N. Kucher, D. Spirk, C. Kalka, L. Mazzolai, D. Nobel, M. Banyai, et al., Clinical

predictors of prophylaxis use prior to onset of acute venous thromboembolism in hospitalized patients SWIss Venous Thrombo Embolism Registry (SWIVTER), J. Thromb. Haemost. 6 (2008) 2082e2087.

[20] V. Bahl, H.M. Hu, P.K. Henke, T.W. Wakefield, D.A. Campbell Jr., J.A. Caprini,

A validation study of a retrospective venous thromboembolism risk scoring method, Ann. Surg. 251 (2010) 344e350.

[21] A.T. Cohen, V.F. Tapson, J.F. Bergmann, S.Z. Goldhaber, A.K. Kakkar, B. Deslandes, et al., Venous thromboembolism risk and prophylaxis in the acute hospital care setting (ENDORSE study): a multinational cross-sectional study, Lancet 371 (2008) 387e394.

[22] S.O. Roger Jr., R.K. Kilaru, P. Hosokawa, W.G. Henderson, M.J. Zinner, S.F. Khuri,
Multivariable predictors of postoperative venous thromboembolic events after general and vascular surgery: results from the patient safety in surgery
study, J. Am. Coll. Surg. 204 (2007) 1211e1221.
[23] NICE clinicalguideline 92. Venous thromboembolism in adults admitted to hospital: reducing therisk. guidance.nice.org.uk/cg92 Issued: January 2010
last modified: June 2015.
[24] J.A. Caprini, Thrombosis risk assessment as a guide to quality patient care, Dis.
Mon. 51 (2005) 70e78.
[25] C.J. Pannucci, S.H. Bailey, G. Dreszer, et al., Validation of the Caprini riskassessment model in plastic and reconstructive surgery patients, J. Am. Coll. Surg. 212 (2011) 105e112.
[26] P.D. Hewes, K.J. Hachey, X.W. Zhang, Y. Tripodis, P. Rosenkranz, M.I. Ebright, et
al., Evaluation of the Caprini model for venothromboembolism in Esophagectomy patients, Ann. Thorac. Surg. (2015). S0003-4975: 00937e00946.
[27] Hai e Xia Zhou, Li- Qing Peng, Yu Yan, Qun Yi, Yong-Jiang Tang, Yong-Chun Shen, et al., Validation of the Caprini risk assessment model in Chinese

hospitalised patients with venous thromboembolism, J. Thromb. Res. 130 (2012) 735e740.

[28] M.A. Stratton, F.A. Anderson, H.I. Bussey, J. Caprini, A. Comerota, S.T. Haines, et

al., Prevention of venous thromboembolism adherence to the 1995 American College of Chest Physicians consensus guidelines for surgical patients, Arch Intern Med 14 (160) (2000) 334e340.

[29] F.A. Anderson Jr., F.A. Spencer, Risk factors for venous thromboembolism, Circulation 107 (2003), 19e16.

[30] J.A. Heit, M.D. Silverstein, D.N. Mohr, T.M. Petterson, W.M. O'Fallon, L.J. Melton 3rd, Risk factors for deep vein thrombosis and pulmonary embolism: a population-based case-control study, Arch. Intern Med. 160 (2000) 809e881.

[31] B. Buchberg, H. Masoomi, K. Lusby, J. Choi, A. Barleben, C. Magno, et al., Incidence and risk factors of venous thromboembolism in colorectal surgery does laparoscopy impart an advantage? Arch. Surg. 146 (2011) 739e743.

[32] N. Nguyen, M. Hinojosa, C. Fayad, E. Varela, V. Konyalian, M. Stamos, S. Wilson,

PROFORMA

Name	:	I.P. No	:
Age	:	Unit	:
Sex	:	D.O.A	:
Occupation	:	D.O.D	:
Address	:		
Phone No	:	D.O. Surgery	

CHIEF COMPLAINTS

PAST HISTORY:-

1) History of similar complaints
2) Treatment taken
3) History of Drug intake
4) History suggestive of Hypertension / Diabetes / Tuberculosis / heart disease / jaundice / thyroid disorder.

PERSONAL HISTORY:-

Diet : Vegetarian / Mixed

Habits : Smoking / Alcohol / Tobacco

Bowel habits

Bladder

Sleep

FAMILY HISTORY:-

Relevant / Not

MENSTRUAL HISTORY:-

Amenorrhoea / menorrhagia

Regular / Not

Duration

Associated / Not with pain

L.M.P.

GENERAL PHYSICAL EXAMINATION : -

1. General survey
2. Body build and nourishment
3. Appearance
4. Attitude : Restless / Quiet
5. Dehydration : Mild/ Moderate / Severe / Nil
6. Anaemia / Jaundice / Clubbing Cyanosis / Lymphadenopathy / Pedal oedema.
7. Eye signs
8. Skin Changes
9. Pulse

10. Temperature
11. Respiratory rate
12. Blood pressure

SYSTEMIC EXAMINATION

- Cardiovascular system
- Respiratory System
- Central nervous system
- Genito - urinary system
- Abdomen

INVESTIGATIONS:-

1. Blood : Hb%
2. TLC
3. DLC
4. BT
5. CT
6. ESR
7. Blood group and rh type.
8. Urine : Albumin / Sugar / Microscopy
9. Blood : sugar / Urea / creatinine
10. ECG
11. USG abdomen and pelvis
12. CECT Abdomen/pelvis
13. Colonoscopy

14.HPE

15.HIV

16.HbsAg

17.Others

DIAGNOSIS

MANAGEMENT

SURGICAL

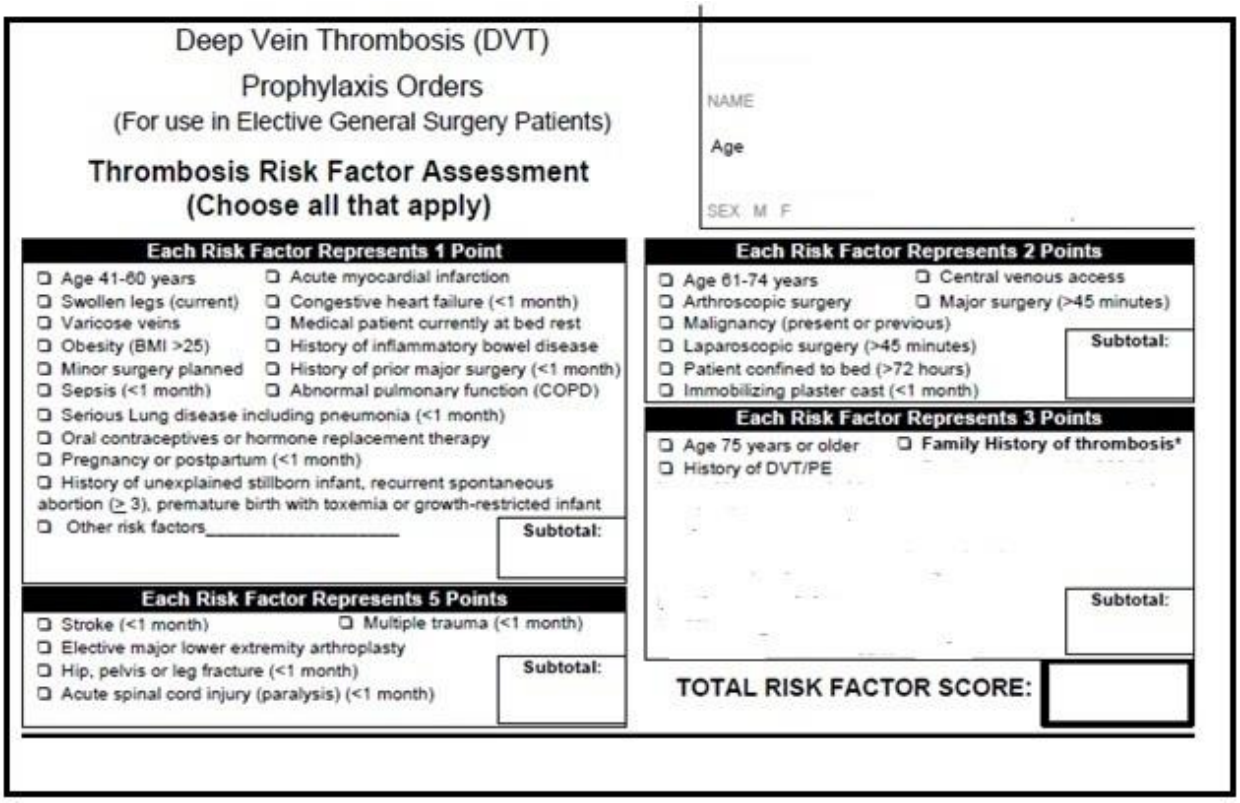
Pre operative instructions

Type of Anaesthesia

Post - operative instructions

Post - operative period/Post - operative complication management

ADAPTED CAPRINI SCORING SYSTEM



Deep Vein Thrombosis (DVT)

Prophylaxis Orders

(For use in Elective General Surgery Patients)

NAME

Age

SEX M F

Thrombosis Risk Factor Assessment
(Choose all that apply)

Each Risk Factor Represents 1 Point

- ❑ Age 41-60 years
- ❑ Swollen legs (current)
- ❑ Varicose veins
- ❑ Obesity (BMI >25)
- ❑ Minor surgery planned
- ❑ Sepsis (<1 month)
- ❑ Acute myocardial infarction
- ❑ Congestive heart failure (<1 month)
- ❑ Medical patient currently at bed rest
- ❑ History of inflammatory bowel disease
- ❑ History of prior major surgery (<1 month)
- ❑ Abnormal pulmonary function (COPD)
- ❑ Serious Lung disease including pneumonia (<1 month)
- ❑ Oral contraceptives or hormone replacement therapy
- ❑ Pregnancy or postpartum (<1 month)
- ❑ History of unexplained stillborn infant, recurrent spontaneous abortion (≥ 3), premature birth with toxemia or growth-restricted infant
- ❑ Other risk factors_____

Subtotal:

Each Risk Factor Represents 2 Points

- ❑ Age 61-74 years
- ❑ Arthroscopic surgery
- ❑ Malignancy (present or previous)
- ❑ Laparoscopic surgery (>45 minutes)
- ❑ Patient confined to bed (>72 hours)
- ❑ Immobilizing plaster cast (<1 month)
- ❑ Central venous access
- ❑ Major surgery (>45 minutes)

Subtotal:

Each Risk Factor Represents 3 Points

- ❑ Age 75 years or older
- ❑ History of DVT/PE
- ❑ **Family History of thrombosis***

Subtotal:

Each Risk Factor Represents 5 Points

- ❑ Stroke (<1 month)
- ❑ Elective major lower extremity arthroplasty
- ❑ Hip, pelvis or leg fracture (<1 month)
- ❑ Acute spinal cord injury (paralysis) (<1 month)
- ❑ Multiple trauma (<1 month)

Subtotal:

TOTAL RISK FACTOR SCORE:

MASTER CHART:

sl.no	NAME	AGE	SEX	IP NO	DIAGNOSIS	TREATMENT	SCORE	DVT
1	Thangavel	45/M	M	68272	Chronic cholecystitis	Laparoscopic Cholecystectomy	4	
2	Ramakannan	19/M	M	69785	Rt. Gynaecomastia	Webster's procedure	2	
3	Alagarsamy	70/M	M	108	Rt. Hydrocele	Rt. Jabolay's procedure	4	
4	Karuppaiah	56/M	M	69920	Rt. Inguinal hernia	Rt. Hernioplasty	2	
5	Murugan	63/M	M	69882	Rt. Inguinal hernia	Rt. Hernioplasty	4	
6	Mayammal	39/F	F	205	Lt. Varicose veins	Lt. Trendelenberg surgery	3	
7	Bose	51/M	M	7070	Carcinoma Lt. Lateral aspect of Tongue	Lt. Hemiglossection with LT. Supraomohyoid dissection	3	
8	Jothi	45/F	F	69865	Chronic cholecystitis	Lap. Cholecystectomy	7	
9	Pandivel	26/M	M	153	Lt. Inguinal Hernia	Lap. Lt. Hernioplasty	2	
10	Meenatchi sundaram	55/M	M	1669	Lt. Inguinal Hernia	Lt. Hernioplasty	4	
11	Sonai	46/M	M	1787	Rt. Hydrocele	Rt. Jabouley's procedure	2	
12	Subramaniyam	75/M	M	67517	Gr. II Haemorrhoids	Open Hemorrhoidectomy	7	
13	MARIAPPAN	48/M	M	1773	CA PAROTID LT	TOTAL RADICAL PAROTIDECTOMY LT WITH LT MRND	4	
14	ESWAR PRABU	13/M	M	2908	VARICOCELE LT	LAP VARICOCELECTOMY	2	
15	MUNIYANDI	70/M	M	68266	RT INGUINAL HERNIA	RT OPEN HERNIOPLASTY	5	
16	AZHAGAR	70/M	M	1652	LT INGUINAL HERNIA	LT HERNIOPLASTY	4	
17	Padma	38/F	F	1655	Carcinoma Rectum	Lap/Open APR	3	
18	Alagumuthu	43/M	M	5325	Mucocele of Appendix	Laparoscopic Appendicectomy	3	
19	Shamugapriya	23/F	F	5449	Rt. Cervical Adenopathy	Excision biopsy	3	
20	Andi	63/M	M	1673	Vesical calculus	Open vesicolithotomy	5	
21	Raman	60/M	M	2916	Rt. Inguinal hernia	Rt. Open inguinal hernioplasty	4	
22	Subramani	63/M	M	1754	Rt. Inguinal hernia	Rt. Open inguinal hernioplasty	5	
23	Sivanandi	58/M	M	1149529	Raw area Rt. Sole of foot	SSG	3	
24	Logeshwari	34/f	F	5260	Paraumbilical Hernia	Open mesh repair	4	
25	Loorthumarry	50/f	F	70751	Post AR/ Transverse loop colostomy	Transverse Loop colsotomy	6	
26	Selvaraj	50/m	M	69922	Lt. Varicose veins with ulcer	Lt. Trendelenberg procedure + SSG	5	
27	Thangaraj	60/m	M	3026	Lt. Inguinal hernia	Lt. Hernioplasty	5	
28	Arumugam	45/m	M	5302	Rt. Inguinal hernia	Rt. Hernioplasty	3	
29	Karuppasamy	47/m	M	5215	Rt. Epididymal cyst	Excision & biopsy	1	
30	Senthilkumar	27/m	M	5142	Ulcer Rt. Foot	ssg	1	
31	**Ayyalakshmi**	**53/F**	**F**	**5935**	**Carcinoma stomach**	**Laparotomy & proceed**	**5**	**YES**
32	Tamilkani	21/F	F	10781	Cervical Lymphadenopathy	Excision biopsy	2	
33	Muthupandi	27/M	M	9042	Post Cricoid growth	Feeding Jejunostomy	2	
34	Rajapandi	47/M	M	10670	Rt. Inguinal hernia	Rt. Inguinal Hernioplaty	3	
35	Jeyam	57/M	M	8981	Lt. Inguinal hernia	Lt. Inguinal Hernioplaty	3	
36	Raman	67/M	M	670	Rt. Inguinal hernia	TEP	5	
37	Chinnakaruppan	88/M	M	11828	B/L Inguinal Hernia	Stoppa's mesh repair	7	
38	Subramanian	67/M	M	10445	Anal Polyp	Polypectmy With Hemorrhoidectomy	4	
39	Murugesan	38/M	M	7549	Haemorrhoids	Haemorrhoidectomy	1	
40	**Elangovan**	**60/M**	**M**	**1108**	**Ca head of pancreas**	**Whipple's procedure**	**5**	**YES**
41	Vasanthi	71/F	F	10462	Umbilical hernia	Open mesh repair	6	
42	Subramanian	67/M	M	16448	Anal polyp with grade II Hemorrhoids	Polypectomy with Hemorroidectomy	4	
43	Pandi	67/M	M	13514	Lt hydrocele	LT Eversion of sac	4	
44	KARPAGAM	30/F	F	2783	LT PHYLLOIDES	LT SIMPLE	4	

					RECURRENT TUMOUR	MASTECTOMY		
45	KAVITHA	32/F	F	31555	INCISIONAL HERNIA	OPEN MESH REPAIR	4	
46	MURUGANATHAN	55/M	M	31562	LT INGUINAL HERNIA	LT HERNIOPLASTY	4	
47	KARTHIK	27/M	M	3169	LT INGUINAL HERNIA	LT HERNIOPLASTY	2	
48	PANDI	46/M	M	3175	LT INGUINAL HERNIA	LT HERNIOPLASTY	3	
49	SIVANANDI	61/M	M	3603	RT HYDROCELE	RT EXCISION & EVERSION OF SAC	3	
50	**Rajamani**	**75/F**	**F**	**33011**	**Hiatus Hernia with Acute Intestinal obstruction**	**Laparotomy & Proceed**	**7**	**YES**
51	**Muthurakku**	**60**	**F**	**102278**	**Ca OG Junction**	**Thoracolaproscopic Esophago Gastroectomy**	**5**	**YES**
52	Shantha	75/F	F	5755	Lt. Lump Breast	Excision Biopsy	6	
53	Najima Begam	32/F	F	4476	Lt. Fibroadenoma breast	Excision biopsy	3	
54	Alagamuthu Pandi	27/M	M	33002	Rt. Inguinal hernia	Rt. Open Hernioplasty	2	
55	Muthualagu	18/M	M	33045	Lt. Recurrent inguinal hernia	Lt. Open Hernioplasty	2	
56	Kulandaisamy	62/M	M	31593	Rt. Hydrocele	Excision & Eversion of sac	3	
57	**Nallammal**	**70/F**	**F**	**3133**	**Periampullary Carcinoma**	**Whipple's Procedure**	**7**	**YES**
58	Balakrishnan	45/M	M	33509	Hydatid cyst – Peritoneum and spleen	Laparotomy & Proceed	3	
59	Bakiyalakshmi	55/F	F	33858	Carcinoma Breast Rt.	Rt. MRM	4	
60	Jothilakshmi	43/F	F	35709	Lump Lt. Breast	Lumpectomy	3	
61	Ayyar	34/M	M	35883	B/L Inguinal Hernia	Stoppa' Procedure	3	
62	Chellakannu	63/M	M	34968	Alkali Poisoning	Feeding Jejunostomy	6	
63	Periyayya	65/M	M	34216	Suprapubic Growth	Wide Local excision	4	
64	Baskaran	41/M	M	35718	Lt. Inguinal Hernia	Lt. Inguinal Hernioplasty	3	
65	Annakodi	55/M	M	68132	Carcinoma Stomach	Laparotomy & Proceed	3	
66	Muthulakhsmi	47/F	F	7145	Solitary Nodule Thyroid Lt. Lobe	Lt. Hemithyroidectomy	3	
67	Manikandan	20/M	M	71340	Sub Acute Appendicitis	D-Lap & Laparoscopic Appendcectomy	3	
68	Regudevi	40/F	F	68257	Incisional Hernia	Open Mesh repair	3	
69	Veeralakshmi	45/F	F	7112	Varicose vein Rt. Lower Limb	Rt. Trendelenberg Procedure with stripping	4	
70	Arumugam	52/M	M	4301	Lt. Inguinal Hernia	Lt. Inguinal Hernioplasty	3	
71	Madhayanai	66/M	M	60055	Raw area Lt. foot	Flap Inset	4	
72	Jeyalakshmi	65/F	F	66649	Malignant CBD Stricture	Whipple's procedure	6	
73	Dhanam	40/F	F	4404	Lump Lt. Breast	Lumpectomy Lt. breast	3	
74	Moorthy	52/M	M	71190	Umbilical hernia	Open Mesh repair	4	
75	Alagar	60/M	M	68134	Squamous cell carcinoma gluteal region	Wide local excision + rotation flap	3	
76	Renudevi	40/F	F	68257	Incisional hernia – flap necrosis	Secondary suturing	2	
77	Indumathi	28/F	F	1091690	SNG Thyroid Rt. Side	Hemithyroidectomy Rt. Side	3	
78	Sakitha	36/F	F	1091586	Umbilical Hernia	Lap/Open Onlay mesh repair	4	
79	Arokasamy	53/M	M	1091743	Varicose vein Lt. Leg	Trendelenburg's procedure	4	
80	Mariyammal	29/F	F	1093112	Lt. SNG Thyroid	Lt. Hemithyroidectomy	3	
81	Arulanantham	68/M	M	1090919	Incisional Hernia	Open onlay mesh repair	6	
82	Jeyanthilala	60/M	M	1090416	Supraumbilical Hernia	Lap/Open Onaly mesh repair	5	
83	Backiaraj	20/M	M	1092996	Lt. Inguinal Hernia	Lt. Hernioplaty	2	
84	Ramu	40/F	F	1092989	Papillary carcinoma – thyroid	Total thyroidcectomy with B/L MRND	2	
85	Nasardheen	50/M	M	1094702	B/L Inguinal Hernia	B/L Hernioplasty	3	
86	Thangaraj	42/M	M	1093167	TAO Rt. LL	Lumber sympathectomy	3	
87	Marimuthu	48/M	M	1094631	Varicose veins Lt. LL	Lt. LL Trendelenburg surgery	4	
88	Siva	34/F	F	104489	Cholelithiasis	Lap/Open Cholecystectomy	3	
89	Rajesh	27/M	M	48106	Sub acute intestinal obstruction	D-Lap & Proceed	3	
90	Panchavarnam	62/F	F	1104650	? Pseuomyxoma Peritonei	D-Lap & Proceed	6	
91	Thavamani	45/F	F	1104541	Lump Lt. Breast	Lt. Lumpectomy	3	
92	Karupayee	63/F	F	1101498	Raw area Rt. Medial lower Leg	Split skin graft Rt. Lower leg	5	

93	Saraswathi	47/F	F	11053577	Carcinoma Lt. breast	Lt. Modified Radical Mastectomy	3	
94	**Vellaisamy**	**70/M**	**M**	**1101869**	**Carcinoma Penis**	**emasculation with B/L ilioninguinal block dissection**	**7**	**YES**
95	Kamala	40/F	F	1103507	Umbilical Hernia	Mesh repair	3	
96	Saraswathi	47/F	F	11053577	Carcinoma Lt. breast	Lt. Modified Radical Mastectomy	3	
97	Vellaisamy	70/M	M	1101869	Carcinoma Penis	emasculation with B/L ilioninguinal block dissection	4	
98	Kamala	40/F	F	1103507	Umbilical Hernia	Mesh repair	3	
99	chinnasamy	45/m	M	1106125	post – hartmann status	laparotomy & proceed	3	
100	muthuram	40/m	M	1104538	ileocaecal tb	d – lap & proceed	2	
101	varsaraja	36/m	M	48322	sub acute appendicitis	d – lap & proceed	2	
102	vignesh	20/m	M	1107476	sub acute appendicitis	d – lap & proceed	2	
103	chitra	48/f	F	1107267	lt lump breast	lt lumpectomy	4	
104	sentamizh selvi	39/f	F	1107272	lt lump breast	lt lumpectomy	2	
105	seenu	27/M	M	1107377	SUB acute appendicitis	lap appendicectomy	2	
106	sivamurugan	38/M	M	1108568	chronic appendicitis	lap appendicectomy	2	
107	sentamil selvi	39/F	F	1107272	lt. lump breast	lt. lumpectomy	2	
108	chitra	48/F	F	1107267	lt. lump breast	lt. lumpectomy	4	
109	deivendran	56/M	M	1107295	rt. direct inguinal hernia	rt. hernioplasty	4	
110	rengarsaj	64/M	M	1105944	ca stomach	laparotomy & proceed	6	
111	vasantha	50/F	F	1108577	post- gastectomy efferent loop obstruction	laparotomy & proceed	5	
112	manikandan	31/M	M	1107425	cholelithiasis	laparoscopic cholecystectomy	3	
113	rajaram	71/M	M	1106687	rt. direct inguinal hernia	rt. hernioplasty	6	
114	Dhanalakshmi	43/F	F	3058	BILATERAL OVARIAN CYST WITH ADENOMYOSIS	LAPAROTOMY & PROCEED	5	
115	Gomathi	48/F	F	11108718	CALCULUS CHOLECYSTITIS	OPEN CHOLECYSTECTOMY	4	
116	Silambayee	70/F	F	18086	CARCINOMA BREAST RT.	RT. SIDE MODIFIED RADICAL MASTECTOMY	5	
117	Balasubramani	55/M	M	1108569	RT. SUBMANDIBULAR GLAND TUMOUR	EXCISION	5	
118	Thangadurai	44/M	M	1108812	VARICOSE VEIN RT. LEG	RT. SIDE TRNDELENBURG PROCEDURE	4	
119	Kallarasu	25/M	M	48333	FOURNIERS GANGRENE	SSG / CIRCUMCISION	2	
120	rajendran	55/M	M	1111603	malignant gist – stomach + jejuneum	laparotomy & proceed	6	
121	chandramohan	35/M	M	1115418	urachus diverticulum	d-lap & proceed	2	
122	GOPI	57	M	122321	Ca Stomach	LAPAROTOMY & PROCEED	6	
123	SARAVANA	76	M	125673	RIGHT INGUINAL HERNIA	RIGHT HERNIOPLASTY	6	
124	NALLAL	67/M	M	1115998	LIVER ABSCESS	D – LAP & PROCEED	6	
125	SWAMI	56	M	654322	B/L INGUINAL HERNIA	B/L HERNIOPLASTY	5	
126	BRUCE	60	M	543234	LEFT RECCUR. INGUINAL HERNIA	L HERNIOPLASTY	4	
127	BALASUBRAMANIAN	46/M	M	1117645	GRADE IV HAEMORRHOIDS	HAEMORRHOIDECTOMY	3	
128	MAADATHI	65/F	F	1121987	hydatid cyst – liver	laparotomy & Proceed	4	
129	SARASU	38/F	F	1121959	cholelithiasis	lap/open cholecystectomy	4	
130	VIJAYALAKSHMI	30/F	F	1121610	cholelithiasis	lap/open cholecystectomy	2	
131	CHANDRALEKHA	17/F	F	1121817	sub acute appendicitis	lap-appendicectomy	2	
132	VISAK	19/M	M	1121819	lt. undescended testis	d-lap & proceed	2	
133	**vijayalakshmi**	**55**	**F**	**1120617**	**ca rectum**	**abdomino perineal resection**	**7**	**YES**
134	rajeshwari	19/F	F	1121437	mng thyroid	completion thyroidectomy	2	
135	asokan	67/M	M	1120662	cholelithiasis	lap/open cholecystectomy	6	
136	ANANDA NAYAGI	25/F	F	1122922	MNG THYROID	TOTAL THYROIDECTOMY	7	

137	MARIA LYDIA	22/F	F	1126185	LUMP RT BREAST	RT LUMPECTOMY	2	
138	SUGANTHI	19/F	F	1126167	LUMP LT BREAST	LT LUMPECTOMY	2	
139	MUKAYEE	45	F	1256557	VARICOSE VEIN	Trendelenburg's procedure	4	
140	MUTHULAKSHMI	16/F	F	1124718	LIPOMA BACK	EXCISION	1	
141	NASRATH	53/F	F	1121967	LT VARICOSE VEIN	PERFORATOR LIGATION	5	
142	KUMAR	48/M	M	1126243	RT INGUINAL HERNIA	RT HERNIOPLASTY	3	
143	TAMILALAGU	35/M	M	1124802	RT INGUINAL HERNIA	RT HERNIOPLASTY	2	
144	MARIMUTHU	30/M	M	1124238	LT TESTICULAR INFRACTION	LT ORCHIDECTOMY	2	
145	AMUTHA	45/f	F	1123294	CHOLELITHIASIS	LAP/ OPEN CHOLECYSTECTOMY	5	
146	PERIYADURAI	40/m	M	1124765	RT. PAROTID TUMOUR	SUPERFICIAL PAROTIDECTOMY	3	
147	PANCHAVARNAM	50/m	M	1124740	CARCINOMA PENIS	TOTAL PENECTOMY	6	
148	NATARAJAN	57/m	M	11247773	LT. SIDE VARICOSE VEIN	LT. SIDE TRENDELENBURG PROCEDURE	5	
149	MUTHU	60/m	M	1126117	RT. EPIDYMOORHITIS WITH RT. HYDROCELE	RT. ORCHIDECTOMY	5	
150	GEETHA	46/f	F	11126157	CALCULOUS CHOLECYSTITIS	LAP/OPEN CHOLECYSTECTOMY	4	
151	LAKSHMI	65/f	F	1124827	CHOLELITHIASIS	OPEN CHOELCYSTECTOMY	6	
152	VASANTHA	36/f	F	1127744	RT. SIDE SNG – WITH LT. SIDE FIBROADENOMA	RT. SIDE HEMITHYROIDECTOMY + EXCISION LT. SIDE FIBROADENOMA	3	
153	Bhagavathi amma	50/F	F	1135907	Carcinoma breast	Rt. Modified radical mastectomy	4	
154	Raman	18/M	M	58542	Sub acute appendicitis	Lap appendicectomy	2	
155	Vinayagam	54/M	M	48154	Recurrent umbilical hernia	Lap/open mesh repair	4	
156	Sulthana	25/F	F	58232	Paraumbilical hernia	Lap/open mesh repair	3	
157	Muthupechi	46/F	F	1132633	Recurrent ca – breast lt. Side	Wide local excision	5	
158	Subramaniyasami	60/M	M	8138	Bilateral varicose vein	Lt. Side trendelenburg procedure	5	
159	appasamy	37/M	M	113516	Bilateral varicose vein	Lt. Side trendelenburg procedure	3	
160	Bhagavathi devi	50/F	F	1135907	Carcinoma breast	Rt. Modified radical mastectomy	5	
161	Iyyappan	18/M	M	58542	Sub acute appendicitis	Lap appendicectomy	2	
162	Murugesan	54/M	M	48154	Recurrent umbilical hernia	Lap/open mesh repair	4	
163	Jamima begum	25/F	F	58232	Paraumbilical hernia	Lap/open mesh repair	2	
164	Muthulakshmi	46/F	F	1132633	Recurrent ca – breast lt. Side	Wide local excision	3	
165	Subramani	60/M	M	8138	Bilateral varicose vein	Lt. Side trendelenburg procedure	5	
166	Ayyasamy	37/M	M	113516	Bilateral varicose vein	Lt. Side trendelenburg procedure	3	
167	Kannan	45/M	M	1135253	Displaced rt. Inguinal mesh	Wound exploration	3	
168	Gurusamy	69/M	M	48152	Grade iii haemorrhoids	Haemorrhoidectomy	5	
169	Radhakrishnan	40/M	M	1134645	Raw area lt. Limb	Circumcision and grafting	3	
170	karuthammal	60/f	F	1139529	cholelithiasis	lap/open cholecystectomy	5	
171	thannayiram	25/m	M	55527	sub acute appendicitis	lap/open appendicectomy	2	
172	karuppasamy	21/m	M	1140532	tongue tie	tongue tie release	2	
173	mahesh	48/m	M	1139535	b/l inguinal hernia	b/l hernioplasty	4	
174	subramani	55/m	M	1139552	b/l inguinal hernia	b/l hernioplasty	4	
175	manikandan	39/m	M	1138385	rt. inguinal hernia	rt. hernioplasty	2	
176	vairamani	32/m	M	1139670	lt. inguinal hernia	lt. hernioplasty	2	
177	jawahar	48/m	M	59022	grade – ii haemorrhoids	HAEMORRHOIDECTOMY	4	
178	**ramar**	**65/m**	**M**	**1141635**	**partial GOO/ Ca stomach with Liver secondaires**	**laparotomy & proceed**	**7**	**YES**
179	murugan	50/m	M	1141746	sub acute intestinal obstruction	laparotomy & proceed	6	
180	latha	46/f	F	1140523	mng thyroid	total thyroidectomy	3	
181	madurai samy	57/m	M	1140571	incisional hernia with left inguinal hernia	lap/open mesh repair	4	

182	gurubackiyam	60/F	F	68570	carcinoma lt. breast	lt. modified radical mastectomy	4	
183	raman	31/m	M	70062	rt. indirect inguinal hernia	rt. hernioplasty	3	
184	kaleeswari	38/F	F	3142	RIGHT SNG POST LT. HEMITHYROIDECTOMY STATUS	COMPLETION THYROIDECTOMY	2	
185	neelaVathy	24/F	F	5621	CHOLELITHIASIS	LAP/OPEN CHOLECYSTECTOMY	3	
186	bagavathy	65/F	F	8272	CHOLELITHIASIS	LAP/OPEN CHOLECYSTECTOMY	5	
187	suseela	35/F	F	248	CHOLELITHIASIS	LAP/OPEN CHOLECYSTECTOMY	3	
188	velsamy	58/M	M	7732	? fIBROMA lT LEG + LT. INGUINAL HERNIA	EXCISION + LT. HERNIOPLASTY	4	
189	sekar	60/M	M	7741	RT. DIRECT INGUINAL HERNIA	RT. HERNIOPLASTY	5	
190	janakiraman	63/M	M	159	RT. DIRECT INGUINAL HERNIA	RT. HERNIOPLASTY	6	
191	sivaannamml	62/F	F	3161	GRADE III HAEMORRHOIDS	HAEMORRHOIDECTOMY	5	
192	VELLIMALAI	70/M	M	7721	SCROTAL ABDOMEN	REPAIR	5	
193	MANIKAVALLI	30/F	F	9314	LT LUMP BREAST	LT LUMPECTOMY	3	
194	CHANDRAN	41/M	M	7725	LL PERFORATOR INCOMPERENCE	SUBFASCIAL LIGATION	2	
195	SELVARAJ	49/M	M	9179	RT INGUINAL HERNIA	RT HERNIOPLASTY	4	
196	RAVI	40/M	M	9229	LT INGUINAL HERNIA + MULTIPLE SEBACEOUS CYST SCROTUM	LT HERNIOPLASTY + EXCISION	3	
197	**kamauthai**	**66/F**	**F**	**9172**	**carcinoma hepatic flexure**	**rt. hemicolectomy with ileo TRANSVERSE anastamosis**	**4**	**YES**
198	pappa	65/F	F	13646	carcinoma stomach	laparotomy & proceed	7	
199	nagajothi	40/F	F	13707	MNG	TOTAL THYROIDECTOMY	3	
200	Sabariyar	55/M	M	12221	Ca Stomach	Laparotomy & Proceed	6	
201	Mariayammal	52/M	M	12150	MNG + Rectrosternal Extension	Total thyroidectomy	3	
202	Sudha	32/F	F	15452	mng	Total thyroidectomy	2	
203	Jothi	45/F	F	16846	cA rt. Breast	rt. mrm	3	
204	Muthuraman	48/M	M	17634	rt. Indirect Inguinal Hernia	rt. Hernioplasty	5	
205	Mahalingam	75/M	M	16909	lT. Epididymoorchitis Rt. Hydrocele	Lt. High inguinal orchidectomy	6	
206	Selvakumar	57/M	M	1010	Grade III Haemorrhoids	Hemorrhoidectomy	3	
207	macharani	40/F	F	22215	MNG	TOTAL THYROIDECTOMY	4	
208	rajendran	61/M	M	20789	LT. COMPOUND PALMAR GANGALION	EXCISON	3	
209	kanagamani	50	F	170028	LT. FOREARM – RAW AREA	SSG	4	
210	**ondipuli**	**81**	**M**	**20754**	**LT. VARICOSE VEINS**	**LT. TRNDELENBURGE SURGERY**	**7**	**YES**
211	venktaeshwaran	37	M	22196	RT. INDRECT INGUINAL HERNIA	RT. HERNIOPLASTY	2	
212	malaisamy	45	M	2600	sub acute appendicitis	d-lap & proceed	3	
213	shanmugavel	65	M	3983	b/l inguinal hernia	b/l hernioplasty	6	
214	murasoli	52	M	2565	b/l inguinal hernia	b/l hernioplasty	3	
215	mani	41	M	2572	rt. hydrocele	rt. eversion of sac	2	
216	MUTHU	45	M	25094	CA PAROTID LT.	RADICAL LT. PAROTIDECTOMY WITH B/L MRND	5	
217	AMMAPONNU BEEVI	35	F	27988	MNG THYROID	TOTAL THYROIDECTOMY	2	
218	VEERALAKSHMI	57	F	2684	CA BREAST LT.	LT. MODIFIED RADICAL MASTECTOMY	5	
219	MUTHUSAMY	66	M	27953	CHOLELITHIASIS	LAP/OPEN CHOLECYSTECTOMY	5	
220	MURUGESAN	48	M	2810	EPIGASTRIC HERNIA	ONLAY MESH REPAIR	3	
221	ARUNACHALAM	65	M	29370	RT. INGUINAL HERNIA	RT. HERNIOPLASTY	4	
222	MUTHUKUMARESAN	21	M	4660	SUBACUTE APPENDICITIS	LAP. APPENDICECTOMY	5	
223	MURUGAN	77	M	4639	Lt.VARICOCOELE AND B/L DIRECT INGUINAL	LAP/OPEN Lt VARICOCOELECTOMY	4	

					HERNIA	WITH B/L HERNIOPLASTY		
224	MAHESWARI	39	F	71389	MULTI NODULAR GOITRE	TOTAL THYROIDECTOMY	4	
225	SINGAMMAL	69	F	71405	Lt. PARAUMBILICAL HERNIA	OPEN ONLAY MESH REPAIR	2	
226	TAMILAZHAGAN	24	M	4655	FISTULA IN ANO	FISTULECTOMY	6	
227	Jeyaraman	59	M	4654	Carcinoma Rectum	Abdomino perineal resection	2	
228	Balamani	61	F	4842	Carcinoma Lt. Breast	Lt. Modified Radical Mastectomy	6	
229	Arunpandi	16	M	4860	Abdominal pain for evaluation	D-Lap & Proceed	6	
230	Chellapandi	21	M	5071	Lt. Varicocele	Lap. Varicocelecectomy	6	
231	Pandi	50	M	4840	Epigastric hernia	Open onlay mesh repair	3	
232	Karupaiya	70	M	4648	Rt. Direct Inguinal Hernia with Lt. Loin Fibroma with Grade II Haemorrhoids	Rt. Hernioplasty with Lt. Fibroma excision with Haemorrhoidectomy	4	
233	Perumal	70	M	4935	Lt. Hydrocele	Lt. Eversion of Sac	3	
234	Selvaraj	51	M	4649	Fistula in Ano	Fistulectomy	4	
235	SELVARAJ	55	M	75522	CALCULOUS CHOLECYSTITIS	LAP/OPEN CHOLECYSTECTOMY	4	
236	PITCHAIYAMMAL	40	F	75582	CHOLELITHIASIS	LAP/OPEN CHOLECYSTECTOMY	2	
237	VISHNUKUMAR	20	M	5812	LT. VARICOCELE	LT. LAP/OPEN VARICOCELECTOMY	2	
238	SURESH	20	M	77121	SUB ACUTE APPENDICITIS	LAP/OPEN APPENDICECTOMY	2	
239	RAMANARAYANAN	24	M	71122	SUB ACUTE APPENDICITIS	LAP/OPEN APPENDICECTOMY	7	
240	SAMEERABANU	13	F	77205	ABDOMINAL PAIN FOR EVALUATION/ ? MESENTERIC ADENITIS	D-LAP & PROCEED	2	
241	PANDIJYTHOI	40	F	5179	LUMP RT. BREAST	Rt. LUMPECTOMY	6	
242	ABUSALI	58	M	5096	EPIGASTRIC HERNIA	OPEN ONLAY MESH REPAIR	7	
243	ALAGAPPAN	38	M	77117	RT. DIRECT INGUINAL HERNIA	RT. HERNIOPLASTY	2	
244	Shanthi	34	F	697	Acute appendicitis	D-Lap & Proceed	2	
245	Jamuna	31	F	637	Incisional Hernia	Mesh repair	3	
246	Muthumari	45	F	70352	Lt. Lump Breast	Lumpectomy	4	
247	Selvi	40	F	4245	Intestinal obstruction	D-lap & Proceed	5	
248	Ramesh	54	M	6037	Rt. Inguinal Hernia	Rt. Hernioplasty	4	
249	THANGASAMY	65	M	221	ILEO ILEAL INTUSSUSCEPTION	D-LAP & PROCEED	6	
250	GURUNATHA PERUMAL	26	M	221	RT BREAST GYNAECOMASTIA	WEBSTER PROCEDURE	3	
251	NAGAPPAN	51	M	221	UMBILICAL HERNIA	MESH REPAIR	4	
252	Annalakshmi	30	F	574	Lt. SNG Thyroid	Near total thyroidectomy	2	
253	Jyothi	35	F	597	MNG Thyroid	Near total thyroidectomy	2	
254	Karpagam	50	F	577	Rt. Phylloides tumour	Rt. MRM / SCM	3	
255	Podhum ponnu	35	F	575	Rt. Ca breast	Rt. MRM	3	
256	POTHUMPONNU	30	F	207	CA RT BREAST	RT MRM	5	
257	RAVI	57	M	221	B/L INGUINAL HERNIA	B/L HERNIOPLASTY	4	
258	SHANMUGAVEL	59	M	221	GRADE III HAEMORRHOIDS	HAEMORRHOIDECTOMY	5	
259	Manikandan	39	M	17072	B/L Varicose vein with raw area Rt. Leg	Rt. Trebdelenberg procedure with SSG	3	
260	Chinnathai	59	M	1020	Rt. Inguinal Hernia	Rt. Hernioplasty	4	
261	Ramu	45	M	17156	Rt. Inguinal Hernia	Rt. Hernioplasty	6	
262	Kaleeswran	30	M	6801	Grade IV Haemorrhoids	Haemorrhoidectomy	5	
263	Suresh kumar	35	M	6616	Fissure in Ano	Lateral Anal sphincterotomy	5	
264	Ramarajan	55	M	17079	Fissure in Ano	Lateral Anal sphincterotomy	3	
265	**Lakhsmi**	**77**	**F**	**17050**	**Ca rectum & Anal Canal**	**Abdomino-Perineal resection**	**7**	**YES**
266	Eswari	59	F	17554	Ca Rt. Breast	Rt. MRM with Axillary dissection	5	

267	Geetha	32	F	21065	Recurrent Incisional Hernia	Mesh repair	3	
268	Saminathan	55	M	1477	Rt. Inguinal Hernia	Rt. Hernioplasty	4	
269	SHANMUGAM	59	M	25272	PARA-UMBILICAL HERNIA WITH RT. INGUINAL HERNIA	MESH REPAIR WITH RT. HERNIOPLASTY	5	
270	VIJAYA	45	F	25279	LUMP LT. BREAST	LT. LUMPECTOMY	3	
271	KALLANAI	18	M	26974	RT. RECURRENT INGUINAL HERNIA	RT. HERNIOPLASTY	2	
272	KULANDHAI THERASA	45	F	1470	POST RT. MRM WOUND GAPING	SECONDARY SUTURING	3	
273	DHANAPAL	28	M	25312	VARICOSE VEINS RT. LOWER LIMB	RT. TRENDELENBERG PROCEDURE WITH PERFORATOR LIGATION	3	
274	NATARAJAN	70	M	25498	CORROSIVE ACID POISONING	FEEDING JEJUNOSTOMY	3	
275	MURUGAN	47	M	181655	GR. III HAEMORRHOIDS	HAEMORRHOIDECTOMY	3	
276	Annalakshmi	21	F	33423	Rt. SNG Thyroid	Total Thyroidectomy	2	
277	**Silambayee**	**65**	**F**	**30636**	**Ca stomach**	**Laparotomy and Proceed**	**7**	
278	Vanapetchi	70	F	30598	Rt. Ca breast	Rt. MRM	6	**YES**
279	Palaniyandi	30	M	31200	Incisional hernia	Mesh repair	3	
280	Ganesh	58	M	216359	Rt. Inguinal Hernia	Rt. Hernioplasty	3	
281	Senthamarai	31	F	33396	Lt. Breast Fibroadenoma	Excision biopsy	2	
282	Chellappa	70	M	6732	Scrotal Raw Area	SSG scrotum	7	
283	Muthualagu	50	F	36307	Carcinoma stomach	Laparotomy & Proceed	6	
284	Pappathi	50	F	34776	MNG Thyroid	Total Thyroidectomy	3	
285	Deivakani	54	F	36347	Carcinoma Rt. Breast	Rt. MRM	4	
286	Thangam	68	M	37475	Lt. Bubonocele with B/L Hydrocele	Lt. Hernioplasty with B/L Eversion of sac	2	
287	Mayilvaganam	37	M	36343	Rt. Inguinal Hernia	Rt. Hernioplasty	2	
288	Raju	59	M	3478	Rt. Inguinal Hernia	Rt. Hernioplasty Desarda Technique	3	
289	Seeniammal	65	F	3596	Raw area Rt. Foot	SSG	3	
290	Ramanthan	77	M	62357	Ca stomach	Laparotomy & proceed	7	
291	Meenatchi	70	F	63973	Rt. SNG Thyroid	Total Thyroidectomy	6	
292	Karruppaiyah	48	M	65672	Rt. Irreducible Inguinal Hernia	Rt. Hernioplasty	3	
293	JABBAR	48/m	M	59022	grade – ii haemorrhoids	HAEMORRHOIDECTOMY	4	
294	**RASU**	**65/m**	**M**	**1141635**	**partial GOO/ Ca stomach with Liver secondaires**	**laparotomy & proceed**	**7**	**YES**
295	MUSALMAN	50/m	M	1141746	sub acute intestinal obstruction	laparotomy & proceed	6	
296	GEETHA	46/f	F	1140523	mng thyroid	total thyroidectomy	3	
297	madurai muthu	57/m	M	1140571	incisional hernia with left inguinal hernia	lap/open mesh repair	4	
298	backiam	60/F	F	68570	carcinoma lt. breast	lt. modified radical mastectomy	4	
299	ramalingam	31/m	M	70062	rt. indirect inguinal hernia	rt. hernioplasty	3	
300	kaliyamma	38/F	F	3142	RIGHT SNG POST LT. HEMITHYROIDECTOMY STATUS	COMPLETION THYROIDECTOMY	2	
301	neelima	24/F	F	5621	CHOLELITHIASIS	LAP/OPEN CHOLECYSTECTOMY	3	
302	bangaru	65/F	F	8272	CHOLELITHIASIS	LAP/OPEN CHOLECYSTECTOMY	5	

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ETHICS COMMITTEE CERTIFICATE

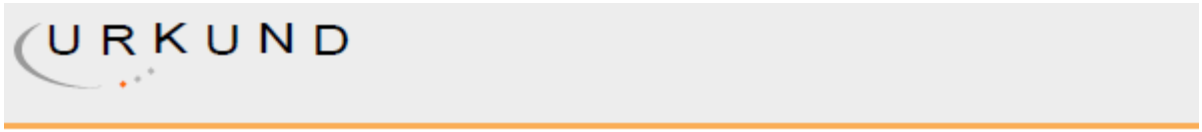
Name of the Candidate	:	Dr.Selvaraj Anbu
Course	:	PG in MS., General Surgery
Period of Study	:	**2015-2018**
College	:	MADURAI MEDICAL COLLEGE
Research Topic	:	Assessing the risk for development of deep vein thrombosis in surgical patients using adapted caprini scoring system
Ethical Committee as on	:	21.04.2017

The Ethics Committee, Madurai Medical College has decided to inform that your Research proposal is accepted.

Member Secretary Chairman Dean / Convenor

Prof Dr V Nagaraajan
M.D., MNAMS, D.M., Dsc.,(Neuro), Dsc (Hon)
CHAIRMAN
IEC - Madurai Medical College
Madurai

PLAGIARISM CERTIFICATE



Urkund Analysis Result

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Significance: 0 %

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This is to certify that this dissertation work titled **PROSPECTIVE STUDY OF "ASSESSING THE RISK FOR DEVELOPMENT OF DEEP VENOUS THROMBOSIS IN SURGICALPATIENTS USING ADAPTED CAPRINI SCORING SYSTEM"**of the candidate **Dr SELVARAJ ANBU** with registration Number **221511117** for the award of **M.S.,** in the branch of **GENERAL SURGERY**. I personally verified the urkund.com website for the purpose of plagiarism Check. I found that the uploaded thesis file contains from introduction to conclusion pages and result shows **0%** percentage of plagiarism in the dissertation.

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